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SR-79
Supplement #1

MARK I EXPERIMENTAL CORPUS AND DESCRIPTOR SET FOR THE STATISTICAL ASSOCIATION PROCEDURES FOR MESSAGE CONTENT ANALYSIS

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ELECTRONIC SYSTEMS DIVISION

AIR FORCE SYSTEMS COMMAND

UNITED STATES AIR FORCE

L. G. Hanscom Field, Bedford, Massachusetts
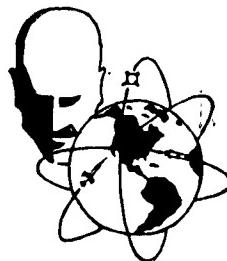
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FOREWORD

This report was prepared from "Mark I Experimental
Corpus and Descriptor Set for the Statistical Asso-
ciation Procedures for Message Content Analysis,"
MITRE SR-79-1, Information System Language Studies,
Number 1, by J. Spiegel of the System Sciences
Department.

ABSTRACT

This supplement to TDR-63-159 describes the corpus initially used for experiments with the Statistical Association Procedures for Message Content Analysis Program. The ASTIA TABs served as a source from which the initial experimental corpus was drawn.

MARK I EXPERIMENTAL CORPUS AND DESCRIPTOR SET
FOR THE STATISTICAL ASSOCIATION PROCEDURES
FOR MESSAGE CONTENT ANALYSIS

This supplement to MITRE SR-79 describes the corpus initially used for experiments with the Statistical Association Procedures for Message Content Analysis Program.

The original need was for a corpus which could be used readily as an input to the Statistical Association program and which, in addition, had a variety of kinds of messages contained within it. Documents have titles, textual material, and, not infrequently, indexes and abstracts as well. Each can be considered as a type of message representing the document. Because of this variety of potentially useful message forms, we considered it rather important to examine the efficacy of the program for such alternative corpus types.

The Armed Services Technical Information Agency's Technical Abstract Bulletins (ASTIA TABs) served as the source from which we drew our initial experimental corpus. In the ASTIA TABs each document referenced by a TAB contains a title, an abstract, and a set of index terms referred to as descriptors. The material is heterogeneous in terms of subject matter, spanning some 33 major fields of science.[1] Additionally, the material is available on punched paper tape and can be easily transferred to a computer-compatible magnetic tape. The TABs used do not involve classification with respect to security.

These advantages outweigh the several disadvantages of using the ASTIA TABs. The major disadvantage is that the complete documents themselves are not part of the TAB. Rather, the Technical Abstract Bulletin contains only a series of representations of the document; that is, title, abstract and index term. This, then, restricts our use of the Statistical

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[1]Rather than list these fields, the reader is referred to any recent issue of the ASTIA TABs.

Association Procedures on "normal language"[2] to that contained in the abstract. Although, at the moment, there does not seem to be any evidence that abstract writing is very different from straight textual writing, it does seem reasonable to suppose that there is more information-packing in abstracts.

The two issues used in the present study were ASTIA TAB #U62-1-6, dated 15 March 1962, and ASTIA TAB #U62-2-1, dated 1 April 1962.[3] The original two TABs contained 1898 individual entries. However, when we transferred the information to the magnetic tape, we found we had received only about 1500 individual entries.

The paper-tape-to-magnetic-tape conversion program was written and executed for us by the IBM Service Bureau on the IBM 1011 Paper Tape Reader, and a printout of the entire unedited corpus was obtained. In writing this conversion program we ran into a series of problems which we solved in an ad hoc fashion. The first arises from the difference in the size of the character set available in the MITRE computer facility and that available with the punched paper tape. The MITRE set contains 47 distinct characters whereas the punched paper tape set contains 95 characters. The paper tape operates in two modes — shift and unshift — thus providing it with the additional characters. One must select from this larger set that subset of symbols most useful for the problem at hand.

A comparison of the paper tape character set compared to the MITRE set for its computer facility is shown in Fig. 1. It should be noted that for some characters we duplicate a previously used character. We

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[2]By "normal language" corpus, we mean writing which has sentential structure and is textual in form.

[3]These were obtained from the Office of Technical Services, United States Department of Commerce in punched paper tape form. The Office of Technical Services is responsible for the release of the unclassified portions of the ASTIA TABs to the public.

do this because the proper or correct character can be readily determined by the context. For example, the MITRE set does not include the % sign; we use instead the $ sign.

The paper tape is generated by ASTIA for printing purposes. As a result, it contains printing instructions which add to the complexity of the conversion program; examples of such instructions are "PRINT RESTORE," "STOP CODE," etc. Fig. 2 shows a sample of the unedited printout we obtain directly from the conversion program. This printout program does not interpret the shift and unshift control character, and, therefore, prints everything from its primary mode. Blanks between letters of words are caused by the occurrence of a mark on the magnetic tape that is not being interpreted. For example, in the printout sample of Fig. 2, the (character is shown as a 9, and the) as a 0. In these instances, the shift mode control character is shown as a blank before the 9 and after the 0.

Since this type of printout is very difficult to read and edit for hash, we reorganized the corpus in line with our thinking about experimenting with varying types of corpora. Accordingly, we divided the original corpus into three parts: one dealing only with the titles of each entry; one dealing with the sets of descriptors assigned each entry; and one dealing with the abstract portion of each entry. Each of these portions then was initially separated and edited on the IBM 1410, by a program which was able to recognize the two mode (shift-unshift) instructions. In addition, the program eliminated those entries that were incomplete or that had machine-recognizable hash intermixed. As a last step the three corpora were printed out. The automatic editing considerably reduced the total number of entries available for experimentation. In the case of the abstracts and the titles corpora, we had a remainder of 1281 individual entries, and for the descriptor set corpus, 1240 individual entries. A sample of the edited titles corpus is shown in Fig. 3, the edited descriptor set corpus in Fig. 4, and the edited abstracts corpus in Fig. 5.

While this preparatory work was being completed, the various sub-routines of the Statistical Association Procedures for Message Content Analysis program were being coded and checked out. However, debugging of the program had to wait until we had selected the particular corpus, since proper debugging required an input close or identical to the ulti-mate input, and an input of such size as to allow manual checking of each major subroutine. Accordingly, we selected the descriptor set corpus for our initial debugging and experimentation.

When ASTIA was developing their automation program in 1959 and 1960, they realized that an indexing scheme was required which would allow them to automatically retrieve documents (or, rather, representations of docu-ments) coded by the particular index term. The specific scheme they chose was based on a three-way hierarchical structure. The largest grouping, 19, is that of "descriptor fields." These major fields are each subdivided into "descriptor groups" which serve to identify the extent of each descriptor field. In turn, these descriptor groups, which number 292, are each subdivided into descriptors identifying the extent of the descriptor group. There are 7000 of these descriptors. A de-scriptor may be one or more terms, e.g., air sea rescues, bromo-carbons, etc., and are assigned to each input document by trained analysts; there are an average of eight descriptors per document.[4]

The full set of descriptors assigned to a document entry can be con-sidered as a set of string of index terms related to the document subject or content matter. Such a string is used as an input to the Statistical Association Procedures for Message Content Analysis program. Among the advantages of using strings of descriptors is that they would yield a

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[4]For further information about descriptors the reader is referred to the Thesaurus of ASTIA Descriptors, First Edition, dated May 1960, and Guidelines for Using ASTIA Descriptors, dated February 1961. Both are available either from ASTIA or from the Office of Technical Services, U.S. Department of Commerce.

relatively small matrix and thus require less time on the computer in order to perform the necessary computations.[5] Additionally, in the literature many papers[6] argue for an *a priori* deletion of common or function words since they presumably add little if at all to the retrival process. Such words do not appear to any great extent in the descriptor corpus and, if the presumption is accurate, they could not add to the normal difficulty of debugging the program. The disadvantage of using the descriptor corpus is, of course, that it is not normal language usage as we have defined it previously.

The descriptor corpus was manually edited to remove duplicate entries; entries which were incomplete but not automatically recognizable as incomplete; entries which contained hash (a) caused by the paper-tape-to-magnetic-tape conversion, (b) carried from the paper tape to the magnetic tape, or (c) inherent in the magnetic tape itself, as well as to eliminate any other possible problem areas. In addition to these deletions, we added an end of descriptor set symbol (a negative zero punch) at the end of each descriptor set entry. The edited descriptor corpus then was used as an input to the Statistical Association Procedures for Message Content Analysis program.

The titles and the abstracts corpora were edited subsequently in an identical fashion, and printouts of the final edited version were obtained. Experimental work has just begun on these latter two corpora.

The three edited corpora then were remerged according to the ASTIA entry number to provide a formatted printout for retrieval purposes. The retrieval algorithm, described in MITRE SR-79, selects the relevant documents and then, for each, prints out the title, the abstract, and the descriptor set. The format of a typical printout of one entry in response

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[5] For details of the Statistical Association Procedures for Message Content Analysis program, the reader is referred to MITRE SR-79, October 1962.

[6] Luhn (1958), Borko (1961), Edmundson (1961), Maron (1961), among others.

to a query is shown in Fig. 6. The internal accounting number should be disregarded by the reader since it is used only for bookkeeping internal to the editing program.

For retrieval, any word or combination of words can be used to key a response provided that only the words chosen for the query are themselves contained in the corpus. If a query word in chosen that does not appear in the corpus, a message is printed out requesting that another query word be used. To circumvent such occurrences, a list of all of the unique words contained in the descriptor set corpus is given in Appendix A.

As indicated, descriptors can be made up of several terms. Since the Statistical Association Procedures for Message Content Analysis program takes each word in a string (the descriptor set assigned to a document) and pairs it with every other word contained in the string it is working on, the number of individual terms found in the corpus is greater than the simple number of descriptors found in the corpus. It should be noted that there are some misspelled terms on this list. When editing the descriptor set corpus, we do not edit out or correct misspellings. In addition, in the case of hyphenated words, the hyphen is deleted and the parts combined to make one word. Thus, the hyphenated descriptor "analog-to-digital" becomes the unique word "analogtodigital."

The complete experimental corpus is given in Appendix B. It should be noted that, when we remerged the three separately edited corpora, we found that for some documents for which we have machine usable descriptors and abstracts we have no machine usable titles, and for some which have titles and descriptors we have no abstracts. This artifact arose when we deleted entries from one of the three corpora without deleting the corresponding entries from the other two corpora. We have indicated these occurrences by a statement such as "No abstract available."

Additional experimentation will be performed on the corpus of abstracts, we will issue a second Supplement setting forth the list of words encountered within that abstract corpus.

REFERENCES

Borko, H. The construction of an empirically based mathematically derived classification system. SDC Document SP-585, 26 October 1961.

Edmundson, H.W. and Wyllys, R.E. Automatic abstracting and indexing -- survey and recommendations. Communications of the Association of Computing Machinery, Vol. 8, #5, 1961 May, 226-234.

Luhn, H.P. Auto-encoding of documents for information retrieval systems. Paper presented at the Symposium on Documentation or a Study of Information Retrieval Systems, University of Southern California School of Library Sciences, 1958 April, 9-11.

Luhn, H.P. The automatic creation of literature abstracts. IBM Journal of Research and Development, Vol. 2, #2, 1958 April, 159-165.

Maron, M.E. Automatic indexing: an experimental inquiry. Journal of the Association of Computing Machinery, Vol. 8, #5, 1961 July, 404-417.

Punched Paper Tape	MITRE Computer Facility	Punched Paper Tape	MITRE Computer Facility
A	A	a	A
B	B	b	B
C	C	c	C
D	D	d	D
E	E	e	E
F	F	f	F
G	G	g	G
H	H	h	H
I	I	i	I
J	J	j	J
K	K	k	K
L	L	l	L
M	M	m	M
N	N	n	N
O	O	o	O
P	P	p	P
Q	Q	q	Q
R	R	r	R
S	S	s	S
T	T	t	T
U	U	u	U
V	V	v	V
W	W	w	W
X	X	x	X
Y	Y	y	Y
Z	Z	z	Z

Fig. 1   Comparison of the Character Sets

Punched Paper Tape	MITRE Computer Facility	Punched Paper Tape	MITRE Computer Facility
0	0	Carriage return	omit
1	1	Hyphen	–
2	2	Shift	Control Character‡‡
3	3	Unshift	Control Character
4	4	Punch off	omit
5	5	Comma	,
6	6	Period	.
7	7	Skip end	omit
8	8	Print disc	omit
9	9	Print restore	omit
)	)	Punch on	omit
±	+	Nonprint select end	omit
<	omit †	Stop code	omit
#	$	#1 Code	omit
$	$	Plus or equals	=
%	$	Semi-colon	delete
>	omit	Apostrophe	'
&	+	Slash	/
*	*	Delete	omit
(	(	Switch code	omit
Space	delete ‡	Colon	omit
Tab	omit		

† These characters were omitted by the paper-tape-to-magnetic-tape conversion program and do not appear on the magnetic tape.

‡ These characters are on the magnetic tape but are deleted by the printing program.

‡‡ These characters control the mode of the printing program.

Fig. 1 (Cont.)

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AD -269 999 D IV. 7, 25 U
9TISTM/TCGU OTS PRICE 4 8.60

P OLYTECHNIC I NST. OF B ROOKLYN, N.Y.
FUEL CELL AND ITS RELATED TECHNOLOGY. I. CORRE-
LATION BETWEEN MAGNETIC SUSCEPTIBILITY AND
CATALYTIC ACTIVITY OF ELECTRODE.
F INAL REPT., 16 J ULY 60-15 J ULY 61,
BY J U C HIN C HU AND S. M. H U. 15 J ULY 61, 20P.
INCL. ILLUS. 40 REFS.
9C ONTRACT DA 44-009-ENG-4586 0
U NCLASSIFIED REPORT

  DESCRIPTORS   98F UEL CELLS, 8M AGNETIC SUSCEPTI-
BILITY, C HEMICAL REACTIONS, 8C ATALYSIS, 8E LEC-
TRODES. 0. 9M AGNETISM, T HIN FILMS, I MPURITIES,
  O XYGEN, R EACTION KINETICS, T HEORY. 0 9R ESO-
NANCE, T ORQUE, M AGNETOMETERS, M EASUREMENT. 0
  9T EST EQUIPMENT, E LECTROMAGNETS, P OWER SUP-
PLIES, A DSORPTION, E LECTROLYTIC CELLS, V ACUUM
SYSTEMS, T EMPERATURE CONTROL, T EST METHODS. 0

M AGNETIC SUSCEPTIBILITY SERVES AS GOOD INDEX
FOR CATALYTIC ACTIVITY OF THE HALF CELL ELECTRODE
IN A FUEL CELL. T HE THEORY OF MAGNETISM WAS
OUTLINED WITH A BRIEF ACCOUNT OF THE MOLECULAR

FIELD THEORY OF PARAMAGNETISM AND DOMAIN THEORY
OF FERROMAGNETISM. C ONTAMINATION, NOTABLY
OXYGEN, OF THE FERROMAGNETIC FILM HAS A MARKED
EFFECT ON THE MAGNETIC PROPERTY. T HE CONTROL
MECHANISM FOR THE CATALYTIC REACTION AT THE
ELECTRODE IS POSTULATED TO INVOLVE CHEMISORPTION.
 F OR THE MEASUREMENT OF MAGNETIC SUSCEPTIBILITY,
THREE METHODS WERE PROPOSED. T HE METHOD FINALLY
ADOPTED FOR THE MAGNETIC SUSCEPTIBILITY MEASURE-
MENT IS A MODIFIED VERSION OF G OUY S METHOD.
 T HE MECHANICAL DETAILS AND COMPLETE LAYOUT AS
WELL AS THEORETICAL ANALYSES ARE FULLY DESCRIBED.
 9A UTHOR O

Fig. 2 Sample of Unedited Printout

270 081   0015   DETERMINATION OF NUCLEAR-ROCKET POWER LEVELS FOR UNMANNED MARS VEHICLES STARTING FROM ORBIT ABOUT EARTH,

270 082   0016   ANALYSIS OF LIQUID-HYDROGEN STORAGE PROBLEMS FOR UNMANNED NUCLEAR-POWERED MARS VEHICLES,

Fig. 3 Edited Titles Corpus

270 081   C014   (SPACE FLIGHT, *SPACE PROBES, MARS, SPACESHIPS, *NUCLEA R PROPULSION, HYDROGEN, TEMPERATURE, THRUST, SPECIFIC IMPULSE, DESIGN, F EASIBILITY STUDIES, MILITARY REQUIREMENTS, THEORY, MATHEMATICAL ANALYSIS .)   -
270 082   C015   (SPACE PROBES, NUCLEAR PROPUL-SION, *PROPELLANTS, HYDRO GEN, LIQUEFIED GASES, STORAGE, SHIELDING, THERMAL INSULATION, METEORS, S PACE ENVIRONMENTAL CONDITIONS.)

Fig. 4 Edited Descriptor Set Corpus

270 081   0015   NUCLEAR-POWERED EARTH-ORBITAL-LAUNCH PROBES CAN PLACE GREATER PAYLOADS IN ORBIT ABOUT MARS THAN CHEMICAL VEHICLES IF REACTOR POWER EXCEEDS 50 MW. SUITABLE REACTOR POWERS FOR THIS MISSION ARE ABOUT 150, 400, AND 1000 MW FOR 33,000-, 81,000-, AND 200,000-LB VEHICLES, RESPECTIVELY. WHEREAS A 33,000-LB VEHICLE REQUIRES GREATER THAN A 200-DAY COAST, A 145-DAY COAST IS FEASIBLE FOR AN 81,000-LB VEHICLE. A HYDROGEN TEMPERATURE OF 4000 F IN THE NOZZLE APPEARS TO BE A GOOD COMPROMISE. USE OF A SOLID-PROPELLANT ROCKET TO ACHIEVE AN ORBIT ABOUT MARS FROM COAST YIELDS NO PAYLOAD ADVANTAGE. USING OPTIMUM FIRING DATES, A 33,000-LB VEHICLE COULD ORBIT AN ACCEPTABLE PAYLOAD ABOUT MARS, AND AN 81,000-LB VEHICLE COULD LAND FREIGHT ON MARS.

270 082   0016   TANKAGE, NUCLEAR SHIELDING, AND HYDROGEN HEAT INPUT PROBLEMS ARE INVESTIGATED FOR THREE UNMANNED NUCLEAR VEHICLES INTENDED FOR PROBING IN THE VICINITY OF MARS AND LANDING FREIGHT ON MARS. TANK GEOMETRY, TANK AND SUPPORTING-STRUCTURE WEIGHT, AND TANK PROTECTION FROM METEOROIDS ARE DISCUSSED. THE SIZE AND WEIGHT OF THE NUCLEAR SHIELD AS REQUIRED BY A PRESCRIBED ALLOWABLE DOSE AND/OR THE HEAT INPUT TO THE HYDROGEN ARE DETERMINED. THE HYDROGEN HEAT INPUT INCLUDES NUCLEAR, ONBOARD THERMAL, SOLAR, AND PLANETARY SOURCES.

Fig. 5 Edited Abstracts Corpus

12
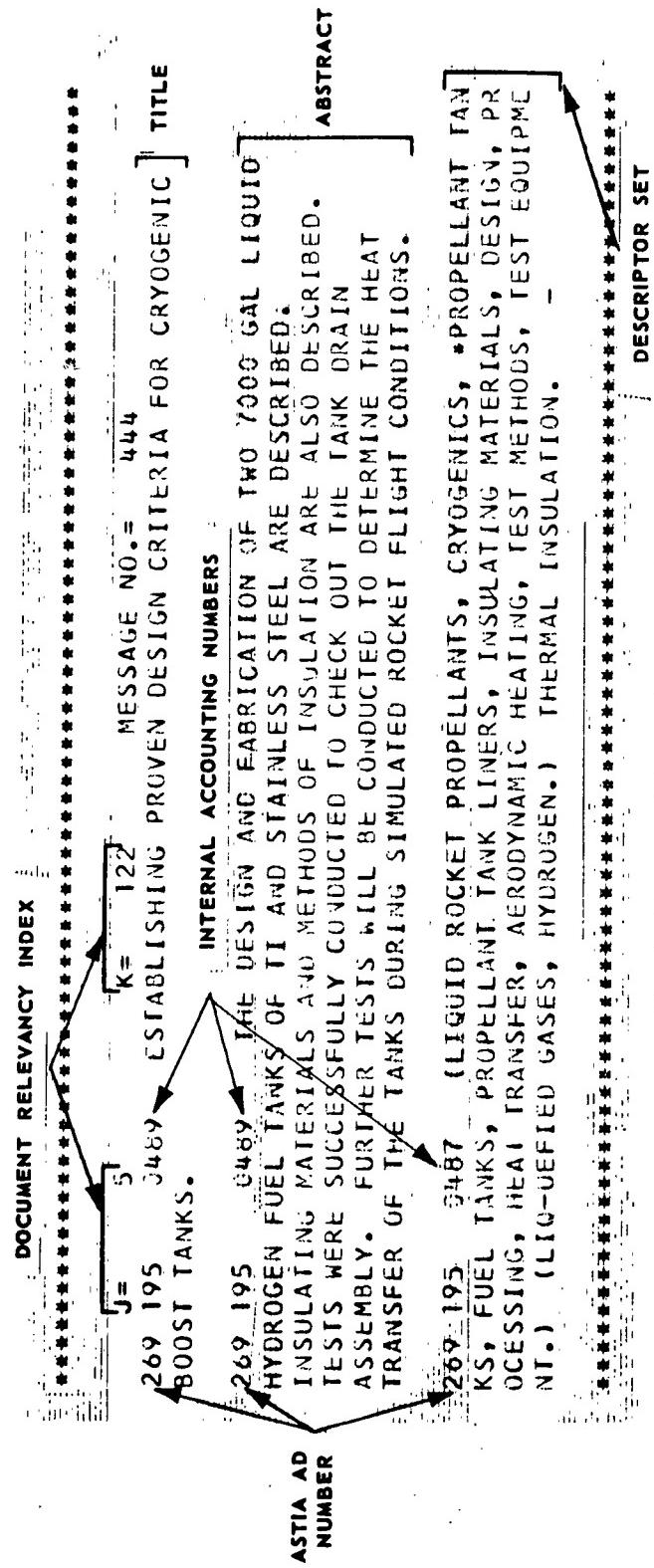
Fig. 6 Format of Typical Retrieval Printout

APPENDIX A

LIST OF UNIQUE WORDS

ABLATION
ABRASION
ABSORPTION
ABSTRACTING
ACCELERATION
ACCELERATORS
ACCELEROMETERS
ACCIDENTS
ACETYLENES
ACID
ACIDS
ACOUSTIC
ACOUSTICS
ACRYLIC
ACTION
ACTUATORS
ACUITY
ADDITIVES
ADENOSINE
ADHESION
ADHESIVES
ADIABATIC
ADJUSTMENT
ADMINISTRATION
ADSORPTION
AERIAL
AERODYNAMIC
AERODYNAMICS
AERONAUTICS
AEROSOLS
AGAINST
AGENTS
AGING
AIR
AIRBORNE
AIRCRAFT
AIRFOILS
AIRFRAMES
AIRPLANE
AIRPLANES
AIRPORTS
ALASKA
ALBUMINS
ALGAE
ALGEBRA
ALGEBRAIC
ALKALI
ALKALINE
ALKOXY
ALKYL

ALLEN
ALLOYS
ALLWEATHER
ALLYL
ALTERNATING
ALTIMETERS
ALTITUDE
ALUMINIZED
ALUMINUM
AMINES
AMINO
AMMONIA
AMMONIUM
AMMUNITION
AMPLIFIERS
AMPLITUDE
ANALOG
ANALOGTODIGITAL
ANALYSIS
ANALYTIC
ANALYZERS
ANAZERS
AND
ANGLE
ANHYDRIDES
ANILINES
ANIMALS
ANODES
ANTENNA
ANTENNAS
ANTHROPOMETRY
ANTIAIRCRAFT
ANTIOXIDANTS
APPARATUS
APPLIED
APPROACH
APTITUDE
ARC
ARCHAEOLOGY
ARCS
AREA
AREAS
ARGON
ARMAMENT
ARMATURES
ARMIES
ARMOR
ARMY
AROUND
ARREST

ARSENIC
ARSENIDES
ARTHROPLASTY
ARTILLERY
ASBESTOS
ASSEMBLIES
ASSISTED
ASSOCIATION
ASTRONOMICAL
ASTRONOMY
ATMOSPHERE
ATMOSPHERES
ATMOSPHERIC
ATMOSPHERICS
ATOMIC
ATOMIZATION
ATOMS
ATTACK
ATTENUATION
ATTITUDES
AUDIOFREQUENCY
AUDITORY
AURORAE
AUSTENTITE
AUTOMATIC
AUTOMATION
AUTORADIOGRAPHY
AUXILIARY
AVIATION
AZIMUTH
AZO
BACTERIA
BACTERIAL
BAINITE
BALANCES
BALL
BALLISTICS
BALLOONS
BAND
BANDPASS
BANDS
BANDSELECTIVE
BARIUM
BARRELS
BASES
BATTERIES
BEACONS
BEAMS
BEARING
BEARINGS

BEHAVIOR
BELT
BELTS
BENZENES
BENZOYL
BERYLLIUM
BESSEL
BIBLIOGRAPHY
BINDERS
BIOCHEMICAL
BIOCHEMISTRY
BIOLOGICAL
BIOLOGY
BIOPHYSICS
BIOSYNTHESIS
BISMUTH
BLACKBODY
BLADES
BLAST
BLOOD
BLUNT
BOARDS
BODIES
BODY
BOMB
BOMBARDMENT
BOMBERS
BOMBING
BOMBS
BONDING
BONDS
BONE
BOOSTER
BORATES
BORIDES
BORON
BOUNDARY
BRACKETS
BRAIN
BRAKE
BRAKES
BRASS
BRAZING
BRIDGES
BRIGHTNESS
BRILLOUIN
BRITTLE
BROADBAND
BROMIDES
BROMINATION

BROMINE
BROMOCARBONS
BUCKLING
BULLDOZERS
BUOYANT
BURNS
BUTADIENES
BUTANES
BUTTERFLY
BUTYL
BY
C
CABINS
CABLES
CADMIUM
CALCIFICATION
CALCIUM
CALCULUS
CALIBRATION
CALORIMETERS
CAMERA
CAMERAS
CAMOUFLAGE
CANTILEVER
CAPACITORS
CAPSULES
CARBIDES
CARBOHYDRATES
CARBON
CARBONATES
CARBONIZATION
CARBOXYLIC
CARGO
CARRIERS
CARTRIDGE
CARTRIDGES
CASES
CASTING
CATALYSIS
CATALYSTS
CATAMARANS
CATHODE
CATHODES
CAVITATION
CELESTIAL
CELL
CELLS
CENTERS
CENTRIFUGES
CERAMIC
CERMETS
CESIUM

CHAMBER
CHAMBERS
CHARGE
CHARGES
CHARTS
CHECK
CHEMICAL
CHEMICALS
CHEMOTHERAPEUTIC
CHLORIDES
CHLORINATION
CHLORINE
CHLOROCARBONS
CHOLESTEROL
CHONDROITIN
CHROMATOGRAPHIC
CHROMIUM
CIRCUITS
CIRCULATION
CLASSIFICATION
CLEANING
CLIMATE
CLIMATIC
CLOSEDCYCLE
CLOSTRIDIUM
CLOTHING
CLOUDS
CLUSTERS
COATINGS
COAXIAL
COBALT
COCKPITS
CODING
COILS
COLLIMATORS
COLLOIDS
COLOR
COLORS
COMBINATORIAL
COMBUSTION
COMMAND
COMMERCE
COMMUNICATION
COMMUNICATIONS
COMMUNISM
COMMUTATORS
COMPLEX
COMPOUNDS
COMPRESSED
COMPRESSIBLE
COMPRESSOR

COMPRESSORS
COMPUTER
COMPUTERS
CONCRETE
CONDENSATION
CONDENSER
CONDENSERS
CONDITIONED
CONDITIONING
CONDITIONS
CONDUCTIVITY
CONDUCTORS
CONFERENCES
CONFIGURATION
CONFIGURATIONS
CONICAL
CONNECTORS
CONSTRUCTION
CONSUMPTION
CONTAINERS
CONTAMINATION
CONTINUED
CONTINUOUS
CONTINUUM
CONTROL
CONTROLLED
CONTROLLERS
CONVECTION
CONVERSION
CONVERTERS
CONVEYORS
COOLANTS
COOLING
COPOLYMERIZATION
COPPER
CORAL
CORDAGE
CORE
CORES
CORRECTION
CORRELATION
CORROSION
CORROSIONRESISTANT
CORROSIVE
COSMIC
COSTS
COTTON
COUNTERMEASURES
COUNTERS
COUPLING

COUPLINGS
COVERINGS
CRATERING
CRAZING
CREEP
CRESYL
CRITICAL
CRUCIBLES
CRYOGENICS
CRYSTAL
CRYSTALLIZATION
CRYSTALS
CUMENES
CURRENT
CURRENTS
CURVE
CUTOFF
CYANATES
CYBERNETICS
CYCLOBUTANES
CYCLOHEXANES
CYCLOHEXENES
CYCLOIDAL
CYCLONES
CYCLOPENTANES
CYCLOPENTENES
CYLINDRICAL
DACRON
DAMAGE
DAMPING
DATA
DECABORANES
DECAY
DECELERATION
DECKS
DECOMPOSITION
DEFENSE
DEFLECTION
DEFORMATION
DEGASIFICATION
DEHYDRATION
DELAY
DENSITY
DEPOSITS
DEPOTS
DESIGN
DETECTION
DETECTORS
DETERIORATION
DETERMINANTS

DETERMINATION
DETONATION
DETONATORS
DEVICES
DIAGNOSIS
DICTIONARIES
DIELECTRIC
DIELECTRICS
DIENE
DIENES
DIES
DIFFERENCE
DIFFERENTIAL
DIFFRACTION
DIFFUSION
DIGITAL
DIODES
DIOXIDE
DIOXIDES
DIPOLE
DIRECT
DIRECTION
DISCHARGE
DISCHARGES
DISEASES
DISPLAY
DISSOCIATION
DISTRIBUTION
DISTRIBUTIONS
DISTURBANCES
DIURNAL
DIVERSITY
DOCUMENTATION
DOPPLER
DOSE
DRAG
DRAWING
DROP
DROPS
DUCT
DURING
DYNAMICS
EARTH
EARTHQUAKES
ECHINODERMS
ECHO
ECOLOGICAL
ECOLOGY
ECONOMIC
ECONOMICS

EFFECT
EFFECTIVENESS
EFFECTS
ELASTIC
ELASTICITY
ELASTOMERS
ELECTRIC
ELECTRICAL
ELECTRICITY
ELECTROCARDIOGRAPH
ELECTROCHEMISTRY
ELECTRODEPOSITION
ELECTRODES
ELECTROLYSIS
ELECTROLYTES
ELECTROLYTIC
ELECTROMAGNETIC
ELECTROMAGNETS
ELECTROMECHANICAL
ELECTRON
ELECTRONIC
ELECTRONICS
ELECTRONS
ELECTROPLATING
ELECTROSTATIC
ELECTROSTATICS
ELEMENTS
ELIMINATORS
EMISSION
ENERGY
ENGINE
ENGINEERING
ENGINES
ENTHALPY
ENTROPY
ENTRY
ENVIRONMENTAL
ENZYMES
EPOXIDES
EPOXY
EQUATION
EQUATIONS
EQUILIBRIUM
EQUIPMENT
EROSION
ERRORS
ESTERS
ETHANOLS
ETHERS
ETHYL

ETHYLENE
ETHYLENES
EUTECTICS
EVAPORATION
EXCHANGE
EXCHANGERS
EXCITATION
EXCRETION
EXHAUST
EXHOCK
EXPANDED
EXPANDERS
EXPANSION
EXPECTANCY
EXPERIMENTAL
EXPLOSIONS
EXPLOSIVE
EXPLOSIVES
EXTERNAL
EXTRACTION
EXTRATERRESTRIAL
EXTREMELY
EXTRUSION
FABRICS
FACILITIES
FACTOR
FACTORS
FAILURE
FALLOUT
FATIGUE
FATIQUE
FATTY
FEASIBILITY
FEED
FEEDBACK
FEEDING
FERRITES
FERROELECTRIC
FERROELECTRICITY
FERROMAGNETIC
FERROMAGNETISM
FIBERS
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FIELDS
FIGHTERS
FILAMENT
FILAMENTS
FILM
FILMS
FILTERS

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FINISHES
FIRE
FISHES
FISSION
FITNESS
FITTING
FLAME
FLAMES
FLAPS
FLARES
FLASH
FLIGHT
FLIGHTS
FLOTATION
FLOW
FLOWMETERS
FLUID
FLUIDS
FLUORESCENCE
FLUORESCENT
FLUORIDES
FLUORINATION
FLUOROCARBONS
FLUXES
FOCUSING
FOG
FOILS
FOR
FORCE
FORECASTING
FOREIGN
FORGE
FORGING
FORMATION
FORMING
FOURIER
FRACTIONATION
FRACTIONS
FRACTURE
FRAGMENTATION
FREE
FREQUENCY
FRICTION
FROM
FUEL
FUELS
FUNCTION
FUNCTIONAL
FUNCTIONS

FUNGI	HALIDES
FURAN	HALL
FURNACES	HALOCARBONS
FUSION	HALOGENATION
FUZES	HAMMERS
GAGES	HANDBOOKS
GALAXIES	HANDLING
GALLIUM	HARDENING
GALVANOMETERS	HARDNESS
GAMES	HARDWARE
GAMMA	HARMONIC
GARNET	HARNESS
GAS	HAWAII
GASES	HAZARDS
GEAR	HEARING
GEARS	HEART
GENERATING	HEAT
GENERATORS	HEATING
GEODESICS	HEATRESISTANT
GEODETIC	HEIGHT
GEOLOGY	HELICOPTER
GEOMETRY	HELICOPTERS
GEOPHYSICAL	HELIUM
GEOPHYSICS	HELIXES
GERMANIUM	HELMETS
GIMBALS	HETEROCYCLIC
GLASS	HETEROGENEOUS
GLIDERS	HEXANES
GLYCOLS	HIGH
GLYCOSIDES	HIGHSPEED
GOLD	HISTOLOGICAL
GRAINS	HISTOLYTICUM
GRAPHITE	HOLDERS
GRATINGS	HONEYCOMB
GRAVITY	HORMONES
GREENLAND	HORNS
GREENS	HOSE
GROUND	HULLS
GROUP	HUMAN
GROWTH	HUMIDITY
GUANIDINES	HYDRACHLORIC
GUIDANCE	HYDRAULIC
GUIDE	HYDRAZINES
GUIDED	HYDRIDES
GUN	HYDROCARBONS
GUNS	HYDRODYNAMICS
GYRO	HYDROFOILS
GYROSCOPES	HYDROGEN
HAFNIUM	HYDROSTATIC
HAIL	HYDROXIDES

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HYPERSONICS
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IMPELLERS
IMPREGNATION
IMPULSE
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INEQUALITIES
INERTIAL
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INFORMATION
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INHIBITION
INHIBITORS
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INLETS
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INSTRUMENT
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INSTRUMENTS
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INTERVAL
IODATES
IODIDES
IODINE
ION
IONIC
IONIZATION
IONOSPHERE
IONOSPHERIC
IONS
IRON
ISLANDS
ISOLATORS
ISOMERS
ISOPRENE
ISOTOPES
JAMMING
JET
JETS
JOB
JOINTS
JUPITER
KEROSENE
KETONES
KEYERS
KIDNEYS
KINETIC
KINETICS
KITS
KLYSTRONS
L
LABELED
LABOR
LABORATORIES
LABORATORY
LAMINAR
LAMINATES
LAMPS
LANDING
LANDINGS
LANGUAGE
LATERAL
LATHES

LATTICES	MAGNETRONS
LAUNCHERS	MAGNETS
LAUNCHING	MAIN
LAYER	MAINTENANCE
LEAD	MAMMALS
LEADERSHIP	MANAGEMENT
LEARNING	MANGANESE
LEAST	MANNED
LIAISON	MANOMETERS
LIFE	MANUALS
LIFT	MANUFACTURING
LIGHT	MAP
LIMITERS	MAPPING
LINEAR	MAPS
LINERS	MARINE
LINES	MARS
LININGS	MARTENSITE
LIQUEFIED	MASER
LIQUID	MASERS
LIQUIDS	MASS
LITERATURE	MASTS
LITHIUM	MATERIALS
LIVER	MATHEMATICAL
LOAD	MATHEMATICS
LOADING	MATRIX
LOBING	MATTER
LOGIC	MEASURE
LOGISTICS	MEASUREMENT
LONGITUDINAL	MEASUREMENTS
LOOP	MECHANICAL
LOW	MECHANICS
LUBRICANTS	MEDIA
LUBRICATION	MEDICAL
LUMINESCENCE	MEDITERRANEAN
LUMINESCENT	MELANESIA
LUNAR	MELTING
LYZERS	MEMORY
MACH	MERCURY
MACHINE	METABOLIC
MACHINERY	METABOLISM
MACHINES	METAL
MACHINING	METALLIC
MAGNESIUM	METALLURGICAL
MAGNET	METALLURGY
MAGNETIC	METALORGANIC
MAGNETISM	METALS
MAGNETITE	METAMATHEMATICS
MAGNETOHYDRODYNAMI	METEORITES
MAGNETOMETERS	METEOROLOGICAL
MAGNETOOPTIC	METEOROLOGY

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METERS
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METHODS
METHYL
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MICROMETEOROLOGY
MICRONESIA
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MICROSCOPES
MICROSCOPY
MICROSTRUCTURE
MICROWAVE
MICROWAVES
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MISSILES
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MIXERS
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MIXTURES
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NETS
NETWORKS
NEUTRINOS
NEUTRON
NICKEL
NIOBIUM
NITRATES
NITRATION
NITRIC
NITRIDES
NITROGEN
NOISE
NOMOGRAPHS
NONDESTRUCTIVE
NONLINEAR
NOSES
NOZZLES
NUCLEAR
NUCLEI
NUCLEIC
NUCLEOTIDES
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NUTRITION
NYLON
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OHIO
OILS
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OXIDATION
OXIDATIONREDUCTION
OXIDES
OXIDIZERS
OXYCHLORIDES
OXYGEN
OZONE
PACIFIC
PACKAGED
PACKAGING
PANEL
PANELS
PANORAMIC
PAPER
PARABOLIC
PARACHUTE
PARAMAGNETIC
PARAMETRIC
PARTIAL
PARTICLE
PARTICLES
PASS
PATHOLOGY
PATHS
PATTERNS
PAVEMENTS
PEARLITE
PENETRATION
PENTABORANES
PERCEPTION
PERCHLORIC
PERIODIC
PEROXIDES
PERSONALITY
PERSONNEL

PERTURBATION
PHASE
PHENOLIC
PHENOLS
PHENYL
PHOSPHATES
PHOSPHIDES
PHOSPHINES
PHOSPHONYL
PHOSPHOROUS
PHOSPHORS
PHOSPHORUS
PHOTOCHEMICAL
PHOTOCHEMISTRY
PHOTOELECTRIC
PHOTOELECTRONS
PHOTOEMISSION
PHOTOGRAPHIC
PHOTOGRAPHS
PHOTOGRAPHY
PHOTOLYSIS
PHOTOMETERS
PHOTOMULTIPLIERS
PHOTONS
PHOTOSYNTHESIS
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PHYSICAL
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PHYSIOLOGY
PICKLING
PICTURE
PIEZOELECTRIC
PILOTS
PINCH
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PITCH
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PLASTICITY
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POISONOUS
POLAND
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POLYMERS
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POLYNOMIALS
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POTENTIAL
POWDER
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PROBES
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PROPELLERS
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RADIOFREQUENCY
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RATIOS
RAY
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RDX
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REACTIONS
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REACTOR
REACTORS
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RECEPTION
RECOMBINATION

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REEFS
REENTRY
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REFLECTORS
REFLEX
REFRACTORY
REFRIGERANT
REFRIGERATION
REFUELING
REGENERATION
REGULATORS
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RELATIVITY
RELAXATION
RELAY
RELAYS
RELIABILITY
REPORTS
REPRESENTATION
REQUIREMENTS
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RESISTANCE
RESISTANT
RESISTORS
RESONANCE
RESONATORS
RESPIRATION
REVOLUTION
REYNOLDS
RIBOSE
RINGS
RIVETED
ROADS
ROCK
ROCKE
ROCKET
ROCKETS
RODS
ROLL
ROLLER
ROLLING

ROTARY
ROTATING
ROTATION
ROTORS
RUBBER
RUPTURE
RUTHENIUM
S
SAFETY
SALTS
SAMPLING
SANDWICH
SATELLITE
SATELLITES
SCANNERS
SCATTERING
SCHEDULING
SCIENCE
SCIENTIFIC
SCINTILLATION
SCREENS
SEA
SEALING
SEALS
SEARCH
SECONDARY
SECTIONS
SEISMIC
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SELENIDES
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SEMICONDUCTOR
SEMICONDUCTORS
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SEPARATION
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SHIPBORNE
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SHROUDED
SIDEBANDS
SIGHTS
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SIGNALTONOISE
SILANES
SILICATES
SILICIDES
SILICON
SILICONES
SILVER
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SIMULATORS
SINGLE
SINTERING
SKIN
SLEDS
SMALLPOX
SMOKE
SOCIAL
SOCIOLOGY
SOCIOMETRICS
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SODIUM
SOILS
SOLAR
SOLDERED
SOLDERING
SOLDERS
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SPECTROGRAPHIC
SPECTROMETERS
SPECTROPHOTOMETERS
SPECTROSCOPY
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SPHERES
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STABILIZATION
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STARTER
STARTERS
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STATIC
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STATISTICAL
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STEEL
STEREOCHEMISTRY
STEROIDS
STORAGE
STORMS
STRAIN
STRATEGIC
STRATOSPHERE
STRATUS
STREAMS
STRESS
STRESSES
STROBOSCOPES

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STYRENES
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SUBMARINE
SUBMARINES
SUBMINIATURE
SUBSTANCES
SUBSTITUTES
SUBSTITUTION
SUITS
SULFAMYL
SULFATE
SULFIDES
SULFONATES
SULFUR
SUN
SUNSPOTS
SUPER
SUPERAERODYNAMICS
SUPERSONIC
SUPERSONICS
SUPPLIES
SUPPLY
SUPPORT
SURFACE
SURFACES
SURGERY
SURGICAL
SURVIVAL
SUSCEPTIBILITY
SUSPENSION
SWEDEN
SWEEP
SWITCHES
SWITCHING
SWITZERLAND
SYMPOSIA
SYNCHROTRONS
SYNTHESIS
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TANK

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TANTALUM
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TAYLORS
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TELEMETER
TELEMETERING
TELEPHONE
TELESCOPES
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TELLURIDES
TEMPERATUE
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TENSILE
TENSOR
TERMINAL
TERRAIN
TERRESTRIAL
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TESTING
TESTS
TETROXIDES
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THERAPY
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THERMIONIC
THERMISTORS
THERMOCHEMISTRY
THERMOCOUPLES
THERMODYNAMICS
THERMOELECTRICITY
THERMOMETERS
THERMONUCLEAR
THERMOPILES
THERMOSTATIC
THERMOSTATS
THESES
THICKNESS
THIN
THRESHOLDS
THRUST
THYROID
THYROXINE
TIME
TIMING
TIN

TISSUES
TITANATES
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TOLERANCE
TOLUENES
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TOPLOGY
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TORPEDOES
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TOXICITY
TRACER
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TRACKING
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TRAJECTORIES
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TRANSFORMATIONS
TRANSFORMERS
TRANSFORMS
TRANSISTOR
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TRANSMITTERS
TRANSMITTING
TRANSONIC
TRANSONICS
TRANSPARENT
TRANSPLANTATION
TRANSPORT
TRANSPORTATION
TRAUMA
TRAUMATIC
TRAVELING
TREATMENT
TRIANGULAR
TRIAZINES
TRIGGER
TRIODES
TUBE
TUBES

TUMOR
TUNED
TUNGSTEN
TUNING
TUNNEL
TUNNELS
TURBINE
TURBINES
TURBOJET
TURBORAMJETS
TURBULENCE
TURBULENT
ULTRA
ULTRASONIC
ULTRASONICS
ULTRAVIOLET
UNDERGROUND
UNDERWATER
UNIONS
UPPER
URANIUM
UREA
USSR
VACCINES
VACUUM
VALVES
VAN
VANADIUM
VANES
VAPOR
VAPORIZATION
VAPORS
VARIABLE
VARIABLES
VARIANCE
VARIATIONS
VECTOR
VEHICLE
VEHICLES
VELOCITY
VERBAL
VERTICAL
VERY
VESSELS
VIBRATION
VIBRATORS
VIDEO
VINYL
VIRUS

VIRUSES
VISCOSITY
VISIBILITY
VISUAL
VOCABULARY
VOICE
VOLTAGE
VOLUME
VOLUMETRIC
VORTICES
VS
WAGES
WAKE
WAR
WARFARE
WARHEADS
WARNING
WASTE
WATER
WAVE
WAVEGUIDE
WAVEGUIDES
WAVES
WEAPONS
WEATHER
WEBBING
WEDGES
WEIGHT
WEIGHTLESSNESS
WELDED
WELDING
WELDS
WETTING
WIDE
WIND
WINDING
WINDOWS
WINGS
WIRE
WITH
WOUND
WOUNDS
X
XRAY
YAW
YTTRIUM
ZINC
ZIRCONIUM
ZONE
ZONES

APPENDIX B

COMPLETE EXPERIMENTAL CORPUS

270 200   0005   ON PROCEDURES FOR COMPUTING METEOROLOGICAL QUANTITIES
IN THE STRATOSPHERE WITH THE IBM 650,

270 200   0005   A DETAILED DISCUSSION IS GIVEN OF PROCEDURES FOR
COMPUTING GEOSTROPHIC WIND COMPONENTS, VORTICITY, VERTICAL MOTION,
TERMS IN THE VORTICITY EQUATION, AND DIVERGENCE, ALL FOR THE 100-, 50-,
AND 25-MB SURFACE. NO JUSTIFICATION IS GIVEN F OR THE PROCEDURES AND
NO DISCUSSION OF THE RESULTS IS INCLUDED.

270 200   0005   (WEATHER FORECASTING, *STRATO-SPHERE, AIR, *WIND, MATHE
MATICAL ANALYSIS, DIGITAL COMPUTERS, PROGRAMMING.)   -
269 970   0007   TERMINAL FORECASTING MANUAL FOR DETACHMENT 3, 8TH
WEATHER SQUADRON LOCKBOURNE AFB, OHIO.

269 970   0007   NO ABSTRACT AVAILABLE

269 970   0006   (OHIO, AIR FORCE, AIRPORTS, CLIMATE, *METEOROLOGICAL DA
TA, DIURNAL VARIA-TIONS, PERIODIC VARIATIONS, *HANDBOOKS.) (METEOROLOGIC
AL CHARTS, TABLES.) (AIR F ORCE OPERATIONS, WEATHER FORECASTING.)   -
269 992   0008   MINIATURE CRYSTAL OVEN.

269 992   0008   THE INVESTIGATION OF METHODS AND DEVICES BY WHICH
THE TEMPERATURE OF A SINGLE QUARTZ CRYSTAL BLANK CAN BE MAINTAINED AT
85 C IN ENVIRONMENTAL TEMPERATURES RANGING FROM   80 C TO -55 C IS
CONTINUING. VACUUM TESTING WAS BEGUN ON 5 PARTIALLY SILVERED PYREX
DEWARS WHICH WERE FOR USE AS THE INSULATION OF 500-MW OVENS. AN
INITIAL HEAT LEAK TEST OF ONE OF THESE WAS MADE IN CONJUNCTION WITH A
STAINLESS STEEL DEWAR TO DETERMINE WHETHER SUCH A DOUBLE DEWAR HAD
PROMISE FOR USE AS THE INSULATION FOR THE LESS-THAN500-MW OVENS. IN
ADDITION, 3 DIFFERENT TYPES OF INSULATION SYSTEMS FOR USE WITH 50-MW
CRYSTAL OVENS WERE CONSTRUCTED FOR VACUUM-LIFE TESTING. THE SYSTEM
REQUIRED TO SUSPEND THE CORE IN TWO OF THESE INSULATION SYSTEMS WAS
MODIFIED TO REDUCE HEAT LEAK THROUGH IT.

269 992   0007   (*QUARTZ CRYSTALS, *TEMPERATURE CONTROL, SINGLE CRYSTAL
S.) (*THERMAL INSULA-TION, EFFECTIVENESS, HEAT-RESISTANT GLASS, STAINLE
SS STEEL.) (*CRYSTAL OVENS, MINIATURE ELECTRONIC EQUIPMENT, LIFE EXPECT
ANCY, TESTS.) (VACUUM SYSTEMS, LIFE EXPECTANCY.)   -
269 999   0009   FUEL CELL AND ITS RELATED TECHNOLOGY. I. CORRELATION
BETWEEN MAGNETIC SUSCEPTIBILITY AND CATALYTIC ACTIVITY OF ELECTRODE.

269 999   0009   MAGNETIC SUSCEPTIBILITY SERVES AS GOOD INDEX FOR
CATALYTIC ACTIVITY OF THE HALF CELL ELECTRODE IN A FUEL CELL. THE
THEORY OF MAGNETISM WAS OUTLINED WITH A BRIEF ACCOUNT OF THE MOLECULAR
FIELD THEORY OF PARAMAGNETISM AND DOMAIN THEORY OF FERROMAGNETISM.
CONTAMINATION, NOTABLY OXYGEN, OF THE FERROMAGNETIC FILM HAS A MARKED
EFFECT ON THE MAGNETIC PROPERTY. THE CONTROL MECHANISM FOR THE
CATALYTIC REACTION AT THE ELECTRODE IS POSTULATED TO INVOLVE
CHEMISORPTION. FOR THE MEASUREMENT OF MAGNETIC SUSCEPTIBILITY, THREE
METHODS WERE PROPOSED. THE METHOD FINALLY ADOPTED FOR THE MAGNETIC
SUSCEPTIBILITY MEASUREMENT IS A MODIFIED VERSION OF GOUY'S METHOD. THE
MECHANICAL DETAILS AND COMPLETE LAYOUT AS WELL AS THEORETICAL ANALYSES
ARE FULLY DESCRIBED.

269 999   0008   (*FUEL CELLS, *MAGNETIC SUSCEPTI-BILITY, CHEMICAL REACT
IONS, *CATALYSIS, *ELEC-TRODES.) (MAGNETISM, THIN FILMS, IMPURITIES, OX
YGEN, REACTION KINETICS, THEORY.) (RESO-NANCE, TORQUE, MAGNETOMETERS, M
EASUREMENT.) (TEST EQUIPMENT, ELECTROMAGNETS, POWER SUP-PLIES, ADSORPTIO
N, ELECTROLYTIC CELLS, VACUUM SYSTEMS, TEMPERATURE CONTROL, TEST METHODS
-    -
.)   -
270 184   0010   AN INVESTIGATION OF A DIGITAL COMPUTER METHOD OF
DETERMINING THE OPTIMUM DESIGN PARAMETERS OF SHROUDED PROPELLERS.

270 184   0010   A DIGITAL COMPUTER METHOD OF DETERMINING THE OPTIMUM
DESIGN PARAMETERS OF LIGHTLY LOADED SHROUDED PROPELLERS IS PRESENTED.
F'JR SUCH A CASE THE GEOMETRY OF THE VORTEX WAKE MAY BE IDEALLY
.ESCRIBED AS A HELICAL SHEET OF EQUALPITCH VORTEX FILAMENTS ARISING
FROM EACH BLADE TRAILING EDGE AND A RIGHT CIRCULAR BOUNDARY SHEET
COMPOSED OF EQUAL-PITCH HELICAL FILAMENTS ARISING AT THE SHROUD
TRAILING EDGE. THE OPTIMUM CONDITION FOR LIGHT LOADING REQUIRES THAT
THIS WAKE VORTEX PATTERN MOVE AS A RIGID BODY. THIS PATTERN OF
DISTRIBUTED VORTICITY IS ARBITRARILY REPLACED WITH A FINITE NUMBER OF
FINITE, BUT UNKNOWN STRENGTH, VORTEX FILAMENTS. USING THE BIOT-SAVART
RELATION, AN EXPRESSION FOR THE VELOCITY COMPONENTS ASSOCIATED WITH
EACH FILAMENT IS OBTAINED. APPLYING THE BOUNDARY CONDITIONS TO THESE
SETS OF EQUATIONS RESULTS IN A SET OF SIMULTANEOUS EQUATIONS IN TERMS
OF THE UNKNOWN FILAMENT STRENGTHS. THE BLADE BOUND VORTEX DISTRIBUTION
OBTAINED FROM THE SIMULTANEOUS SOLUTION IS COMPARED WITH THE
MEASUREMENTS PREVIOUSLY OBTAINED FROM POTENTIAL TANK MODELS OF A TWO-
AND FOUR-BLADED SHROUDED PROPELLER. IT IS CONCLUDED THAT THIS DIGITAL
COMPUTER METHOD YIELDS RESULTS THAT ARE ADEQUATE FOR DESIGN PURPOSES,
AND IT IS RECOMMENDED THAT THIS METHOD BE USED INSTEAD OF THE POTENTIAL
TANK METHOD FOR OBTAINING THE NECESSARY CHARTS AND TABLES COVERING THE
RANGE OF DESIGN PARAMETERS FOR SHROUDED PROPELLERS.

270 184   0009   (*SHROUDED PROPELLERS, AERIAL PROPELLERS, LOAD DISTRIBU
TION, DESIGN, AERO-DYNAMIC CONFIGURATION, VORTICES, FOURIER ANALYSIS, SE
RIES, DIGITAL COMPUTERS, MATHE-MATICAL PREDICTION, MATHEMATICAL ANALYSIS
.)   -
269 997   0011   PREIMPREGNATED ROVING STUDY.

269 997   0011   A DESCRIPTION IS GIVEN OF THE TEST SPECIMENS BEING
CONSTRUCTED FOR THE RESIN MIGRATION STUDY AND THE REASONS FOR CHOICE OF
THE DESIGN USED. PRELIMINARY EXPERIMENTS OF THE EFFECT OF TACKINESS OF
THE ROVING ON THE ABILITY TO WIND AN UNSTABLE PATTERN ARE DESCRIBED.
THE WORK WAS DONE ON A PLASTER MANDREL OF THE ABL CONFIGURATION IN A
POLAR WRAPPING MACHINE. THE MANDREL WAS COATED WITH A PLASTIC FILM
COVERED WITH A NONSLIPPERY WAX. DETAILED PLANS ARE PRESENTED FOR THE
FABRICATION OF 6 ABL CASES FOR THE STUDY OF THE EFFECT OF VOIDS AND
ROVING BAND WIDTH ON THE PROPERTIES OF WOUND CASES. (AUTHOR)   AD-269
99710N1

269 997   0010   (*ROCKET CASES, PROPELLANT TANKS, CYLINDRICAL BODIES, *
FILAMENT WOUND CONSTRUC-TION, WIRE WINDING MACHINES.) (FIBERS, SYN-THET
IC FIBERS, GLASS TEXTILES, IMPREGNATION, RESINS, EPOXY RESINS, LAMINATES
, FILAMENTS.) (*PRESSURE VESSELS, PROCESSING.)   -

270 068   0012   RESEARCH AND DEVELOPMENT STUDY OF STRESS-STRAIN
CHARACTERISTICS OF SHELLS AND HIGH EXPLOSIVES.

270 068   0012   NO ABSTRACT AVAILABLE

270 068   0011   (*HIGH EXPLOSIVE AMMUNITION, *PROJECTILES, CYLINDRICAL
BODIES, *CARTRIDGE CASES, ROTATING BANDS, EXPLOSIVES, STRESSES, DEFORMAT
ION, MECHANICAL PROPERTIES, DESIGN, TESTS.)   —
270 071   0013   DEVELOPMENT OF PULSE RECORDER, QRC-122(T),

270 071   0013   PULSE RECORDER, QRC-122(T) CONSISTS OF A DUAL BEAM,
HIGH FREQUENCY OSCILLOSCOPE THAT IS PHOTOGRAPHED BY A 16 MM HIGH SPEED
SHUTTERLESS CAMERA WHILE ANOTHER DUAL BEAM OSCILLOSCOPE IS EMPLOYED FOR
MONITORING AND RAPID INTERNAL CHECKING. OPERATOR CONTROLS ARE
CENTRALLY LOCATED. TIMING AND REFERENCE MARKERS APPEAR ON THE
PROCESSED FILM TO INDICATE SUCH VARIABLES AS HORIZONTAL SWEEP SPEED,
VERTICAL SENSITIVITY, VIDEO INPUT IN USE AND TIME OF DAY INFORMATION.
THE DESIGN EMPHASIZED EASE OF INSTALLATION AND OPERATION, RUGGEDNESS,
PORTABILITY, RELIABILITY, MAINTAINABILITY AND STRICT RFI CONTROL.

270 071   0012   (RADAR PULSES, *VIDEO SIGNALS, *RECORDING DEVICES, *PHO
TOGRAPHIC RECORDING SYSTEMS, HIGH-SPEED PHOTOGRAPHY, PULSE ANALYZERS, *O
SCILLOSCOPES, CATHODE RAY TUBE SCREENS, DISPLAY SYSTEMS, TIME INTERVAL C
OUNTERS, SWEEP GENERATORS, ELECTRONiC CIR-CUITS, POWER SUPPLIES, DESIGN.
)   —
270 095   0014   NO TITLE AVAILABLE

270 095   0014   A SERIES OF NEW ORGANOSILAZANE MONOMERS WAS PREPARED
AND CHARACTERIZED. THESE NEW MONOMERS INCLUDE THE AMMONIA,
METHYLAMINE, AND ANILINE DERIVATIVES OF 1,3-BIS(CHLORODIMETHYLSILYL)-2,
2-DIMETHYL-1,3 DIAZA-2-SILACYCLOHEXANE AND
1,3-BIS(CHLORODIMETHYLSILYL)2,2-DIMETHYL-1,3DIAZA-2-SILACYCLOPENTANE,
AND THE METHYLAMINE DERIVATIVE OF
270 095   0013   (*HEAT RESISTANT POLYMERS, *ELASTOMERS, *SILICON COMPOU
NDS, *NITROGEN COMPOUNDS, SYNTHESIS.) (POLYMERS, CHLORINE COMPOUNDS, ME
THYL RADICALS, PHENYL RADICALS, SILANES, AZO RADICALS, CYCLOPENTANES, CY
CLO-HEXANES, AMINES, PROPYL RADICALS.) (POLY-MERIZATION, MOLECULAR STRU
CTURE, SOLUBILITY, CATALYSTS, EFFECTIVENESS.) INFRARED SPECTROSCOPY.

270 081   0015   DETERMINATION OF NUCLEAR-ROCKET POWER LEVELS FOR
UNMANNED MARS VEHICLES STARTING FROM ORBIT ABOUT EARTH,
270 081   0015   NUCLEAR-POWERED EARTH-ORBITAL-LAUNCH PROBES CAN
PLACE GREATER PAYLOADS IN ORBIT ABOUT MARS THAN CHEMICAL VEHICLES IF
REACTOR POWER EXCEEDS 50 MW. SUITABLE REACTOR POWERS FOR THIS MISSION
ARE ABOUT 150, 400, AND 1000 MW FOR 33,000-, 81,000-, AND 200,000-LB
VEHICLES, RESPECTIVELY. WHEREAS A 33,000-LB VEHICLE REQUIRES GREATER
THAN A 200-DAY COAST, A 145-DAY COAST IS FEASIBLE FOR AN 81,000-LB
VEHICLE. A HYDROGEN TEMPERATURE OF 4000 F IN THE NOZZLE APPEARS TO BE
A GOOD COMPROMISE. USE OF A SOLID-PROPELLANT ROCKET TO ACHIEVE AN
ORBIT ABOUT MARS FROM COAST YIELDS NO PAYLOAD ADVANTAGE. USING OPTIMUM
FIRING DATES, A 33,000-LB VEHICLE COULD ORBIT AN ACCEPTABLE PAYLOAD
ABOUT MARS, AND AN 81,000-LB VEHICLE COULD LAND FREIGHT ON MARS.

270 081   0014   (SPACE FLIGHT, *SPACE PROBES, MARS, SPACESHIPS, *NUCLEA
R PROPULSION, HYDROGEN, TEMPERATURE, THRUST, SPECIFIC IMPULSE, DESIGN, F
EASIBILITY STUDIES, MILITARY REQUIREMENTS, THEORY, MATHEMATICAL ANALYSIS
.)   -
270 082   0016   ANALYSIS OF LIQUID-HYDROGEN STORAGE PROBLEMS FOR
UNMANNED NUCLEAR-POWERED MARS VEHICLES,

270 082   0016   TANKAGE, NUCLEAR SHIELDING, AND HYDROGEN HEATINPUT
PROBLEMS ARE INVESTIGATED FOR THREE UNMANNED NUCLEAR VEHICLES INTENDED
FOR PROBING IN THE VICINITY OF MARS AND LANDING FREIGHT ON MARS.   TANK
GEOMETRY, TANK AND SUPPORTING-STRUCTURE WEIGHT, AND TANK PROTECTION
FROM METEOROIDS ARE DISCUSSED.   THE SIZE AND WEIGHT OF THE NUCLEAR
SHIELD AS REQUIRED BY A PRESCRIBED ALLOWABLE DOSE AND/OR THE HEAT INPUT
TO THE HYDROGEN ARE DETERMINED.   THE HYDROGEN HEAT INPUT INCLUDES
NUCLEAR, ONBOARD THERMAL, SOLAR, AND PLANETARY SOURCES.

270 082   0015   (SPACE PROBES, NUCLEAR PROPUL-SION, *PROPELLANTS, HYDRO
GEN, LIQUEFIED GASES, STORAGE, SHIELDING, THERMAL INSULATION, METEORS, S
PACE ENVIRONMENTAL CONDITIONS.)   -
269 980   0017   POTENTIAL OF FILAMENT WOUND COMPOSITES.

269 980   0017   A STUDY ON THE EFFECT OF WATER IMMERSION ON THE
TENSILE STRENGTH OF SINGLE E-GLASS FIBERS, COATED WITH A-1100 COUPLING
AGENT AND EPON 820 RESIN, WAS CONDUCTED.   THE FIBERS WERE TESTED BEFORE
AND AFTER WATER IMMERSION OF ONE DAY AND SEVEN DAYS.   NOL RINGS WERE
WOUND DIRECTLY FROM THE MONOFILAMENT FIBER-FORMING APPARATUS   THESE
RINGS WERE TESTED BY THE SPLIT-DISC METHOD.   ANALYTICAL STUDY WAS MADE
TO DETERMINE THE MAXIMUM LOAD AND LOCATION OF FAILURE FOR A COMPOSITE
BAR REINFORCED WITH 2 DISCONTINUOUS FIBERS AND A BAR REINFORCED WITH
ONE DISCONTINUOUS FIBER.   COMPARISON WAS MADE BETWEEN THE THEORY AND
TEST DATA.   FIBER REINFORCED BEAMS WERE TESTED.

269 980   0016   (*BEAMS, *FILAMENT WOUND CON-STRUCTION, *REINFORCING MA
TERIALS, GLASS TEXTILES, RESINS, EPOXY RESINS, FIBERS, COAT-INGS, AMINES
, SILANES, THEORY, BONDING.) (HUMIDITY, TENSILE PROPERTIES, SHEAR STRESS
ES, FRACTURE (MECHANICS), FAILURE (MECHANICS), TEST EQUIPMENT, TEST METH
ODS.)   -
269 405   0018   EVALUATION OF ARCTIC ICE-FREE LAND SITES KRONPRINS
CHRISTIAN LAND AND PEARY LAND, NORTH GREENLAND 1960,

269 405   0018   A REPORT IS GIVEN OF TERRAIN INVESTIGATIONS
CONDUCTED IN NORTH GREENLAND, IN JUNE AND JULY 1960, TO LOCATE
POTENTIAL AIRFIELD SITES.   EIGHT SITES WERE STUDIED   ALL REQUIRE A
SMALL AMOUNT OF GRADING TO MAKE A 5000-FT (1500-M) RUNWAY.   IN ADDITION
THE BROENLUND FJORD AIRFIELD, SITE OF A TEST LANDING ON A NATURAL
SURFACE IN 1957, WAS RE-EXAMINED AND THE EAST HALF OF THE RUNWAY WAS
FOUND UNUSABLE AT THE TIME OF VISIT BECAUSE OF LATE SNOW MELT AND POOR
DRAINAGE.   SCIENTIFIC OBSERVATIONS SHOWED THAT NORTHERN PEARY LAND WAS
COVERED ONLY BY VALLEY GLACIERS DURING THE LAST GLACIAL PERIOD AND THAT
AN EXTENSIVE MARINE INVASION WHICH DEPOSITED MARINE AND RELATED
LACUSTRINE SILT OCCURRED WHEN THE ICE RETREATED ABOUT 6000 YEARS AGO.
THIS WAS FOLLOWED BY A READVANCE OF GLACIERS DOWN MAJOR FJORDS AND
SUBSEQUENT RETREAT TO PRESENT ICE FRONTS.

269 405   0017   (*LANDING FIELDS, *GREENLAND, CONSTRUCTION, GEOPHYSICS,
TERRAIN, CLIMATIC FACTORS.) (GREENLAND, METEOROLOGICAL DATA.) (GREENLA
ND, AIR DROP OPERATIONS.)   -
269 406   0019   EVALUATION OF CONTROL MONITOR AN/GGS-11 PROTOTYPE,

269 406   0019   THE AN/GGA-11 PROVIDES A MEANS FOR A STATION TO
SUBSCRIBE TO RECEIVE ONLY DESIRED INFORMATION FROM TRAFFIC PASSING ON A
HIGH-SPEED PARTY LINE TYPE OF COMMUNICATIONS NETWORK. THE CONTROL
MONITOR IS ALSO CAPABLE OF ACTIVATING ONE OF SIX TRANSMITTERS TO
TRANSMIT INFORMATION UPON REQUEST FROM A MASTER CONTROL STATION. THE
REQUEST IS A CALL-UP CODE CONSISTING OF A 5-CHARACTER, 25BIT, CALL-UP
WORD. EACH STATION COMPARES THE INCOMING CALL-UP WORD WITH AS MANY AS
1000 SUCH WORDS STORED ON A MYLAR DISK WITHIN THE MONITOR. BETWEEN
EACH CALL-UP WORD, A COMPLETE MESSAGE IS TRANSMITTED, AND AN END OF
MESSAGE INDICATION ALERTS EACH STATION TO RECEIVE THE NEXT CALL-UP
WORD, EVEN THOUGH A PARTICULAR STATION MAY NOT HAVE BEEN INTERESTED IN
THE PREVIOUS MESSAGE.

269 406   0018   (*COMMUNICATION EQUIPMENT, *COMMUNICATION SYSTEMS, *ELE
CTRONIC EQUIP-MENT, *CONTROL SYSTEMS, CIRCUITS, TRIGGER CIRCUITS, *ELECT
RICAL NETWORKS, DISPLAY SYS-TEMS, DATA PROCESSING SYSTEMS, DATA TRANS-MI
SSION SYSTEMS, MULTICHANNEL TELEPHONE SYS-TEMS, SWITCHING CIRCUITS, MAGN
ETIC TAPE, MEMORY DEVICES.) (WEATHER COMMUNICATIONS, DESIGN, TESTS.)
-

269 412   0020   STUDY AND INVESTIGATION OF THE APPLICATION OF
SYNTHETIC MAGNETIC WHISKERS TO MICROWAVE CIRCUITS.

269 412   0020   A FEASIBILITY STUDY WAS PERFORMED WHICH SHOWED THAT
FERRITE WHISKERS COULD BE USED TO LIMIT X-BAND POWER FROM 0.3 WATT TO
5 KILOWATTS WITH SPIKE ENERGIES WHICH DO NOT EXCEED 50 ERGS. THE
LIMITER UNIT IS EXTREMELY COMPACT AND INEXPENSIVE TO MANUFACTURE. USED
WITH A VARIABLE REACTANCE DIODE LIMITER, THE FERRITE LIMITER IS CAPABLE
OF PROTECTING RECEIVER DIODES IN THE MICROWAVE RANGE. THE THEORY FOR A
VERY FAST VARIABLE REACTANCE SWITCH WAS DEVELOPED UNDER THIS CONTRACT.
THE RESULTS OF ANALYSIS SHOWED THAT AN EXTREMELY FAST (LESS THAN 50
NANOSECONDS) SWITCHING ACTION COULD BE OBTAINED WITH FERRITE MATERIAL.
THE SWITCH COULD OPERATE AT FREQUENCIES GREATER THAN 3 KMC WITH
REASONABLE DRIVE POWERS. PRELIMINARY ANALYSIS OF A WHISKER AMPLIFIER
INDICATES THAT A MARKED IMPROVEMENT SHOULD RESULT IN THE GAIN BANDWIDTH
PRODUCT AT REASONABLE PUMP LEVELS OVER SINGLE CRYSTAL YIG TYPES.

269 412   0019   (*ELECTRONIC CIRCUITS, MICROWAVE EQUIPMENT, *LIMITERS,
*ELECTRONIC SWITCHES, FERROMAGNETIC MATERIALS, ELECTRIC WIRE, X BAND, FE
RRITES, DESIGN, FEASIBILITY STUDIES.) (AM-PLIFIERS, WAVEGUIDES, *WAVEGU
IDE SWITCHES, CRYSTAL LIMITERS, PHASE SHIFTERS, TESTS.)   -
269 416   0021   AN ANALYSIS OF A TRAJECTORY AND VELOCITY MATCH
TECHNIQUE FOR INTERCEPTING INTERCONTINENTAL BALLISTIC MISSILES.

269 416   0021   A MID-COURSE, TRAJECTORY-MATCH INTERCEPT OF
INTERCONTINENTAL BALLISTIC MISSILES IS ANALYZED. THE INTERCEPT IS
ACCOMPLISHED BY USING A MULTISTAGE ROCKET TO BOOST AN INTERCEPTOR
VEHICLE ONTO A BALLISTIC TRAJECTORY IN THE SAME DIRECTION OF FLIGHT AS
THE WARHEAD TRAJECTORY, SO THAT THE TWO TRAJECTORIES ARE ALMOST TANGENT

AT A SELECTED INTERCEPT POINT. NEAR THE INTERCEPT POINT, A FINAL
ROCKET IS IGNITED TO ACCELERATE THE VEHICLE AND MATCH THE WARHEAD'S
POSITION AND VELOCITY. A SIMPLIFIED ANALYSIS IS PERFORMED FOR THE CASE
OF A CO-PLANAR INTERCEPT OVER A SPHERICAL, NONROTATING EARTH.
INTERCEPT TRAJECTORIES ARE DETERMINED FROM THE TRAJECTORY GEOMETRY AND
THE ROCKET EQUATIONS OF MOTION. AN APPROXIMATE METHOD IS DERIVED TO
ESTIMATE THE THRUSTS AND ROCKET WEIGHTS REQUIRED TO BOOST AN
INTERCEPTOR VEHICLE ONTO THESE TRAJECTORIES.

269 416   0020   (*INTERCEPTION OF SURFACE TO SURFACE, *GUIDED MISSILES.
) (EQUATIONS OF MOTION FOR *GUIDED MISSILE TRAJECTORIES.) (GUIDED MISS
ILE WARHEADS, FLIGHT PATHS.) (INTERCEPTION OF GUIDED MISSILES BY SIMULAT
ION OF VELOCITY AND FLIGHT PATHS OF GUIDED MISSILE WARHEADS.) GUIDED MI
SSILE TRAJECTORIES, MATHEMATICAL ANALYSIS, PARTIAL DIFFERENTIAL EQUATION
S, ANTIAIRCRAFT DEFENSE SYSTEMS.   -
269 418   0022   ASYNCHRONOUS DIGITAL LOGIC CIRCUITS USING
NEURISTORS.

269 418   0022   A STUDY WAS MADE OF THE USE OF NEURISTORS IN THE
CONSTRUCTION OF ASYNCHRONOUS DIGITAL LOGIC CIRCUITS. SPECIFICALLY, THE
PRIMARY OBJECTIVE WAS THE DEVELOPMENT OF A FORMALIZED METHOD FOR THE
DESIGN AND THE CONSTRUCTION OF ASYNCHRONOUS SEQUENTIAL CIRCUITS. THE
NEURISTOR IS AN ACTIVE DEVICE WHICH ACTS AS A ONE-DIMENSIONAL CHANNEL
ALONG WHICH A PULSE MAY PROPAGATE AT A CONSTANT VELOCITY. NEURISTORS
CAN BE JOINED IN 2 BASIC JUNCTION TYPES T AND S JUNCTIONS. A T-S
JUNCTION IS A COMBINATION OF THE 2 BASIC JUNCTION TYPES. USING THESE 3
JUNCTION TYPES, AND, OR AND NOT CIRCUITS CAN BE CONSTRUCTED. THESE
BASIC CIRCUITS CAN BE COMBINED WITH A VARIABLE TREE TO CONSTRUCT ANY
ARBITRARY COMBINATIONAL CIRCUIT. THE NEURISTOR HAS BUILT-IN DELAY.
SEQUENTIAL CIRCUITS CAN BE ANALYSED AS DELAY DEVICES AND REDUCED TO
COMBINATIONAL CIRCUITS, WHICH CAN BE CONSTRUTED USING NEURISTORS.

269 418   0021   (THESES, *COMPUTER LOGIC, *DIGITAL COMPUTERS, *ELECTRON
IC CIRCUITS, COMBINATORIAL ANALYSIS, SEQUENTIAL ANALYSIS, DELAY CIRCUITS
.)   -
269 420   0023   STUDY OF THE DISSIPATION OF INTERNAL ENERGY IN A
VIBRATING BEAM.

269 420   0023   EFFORTS WERE DEVOTED TO THE DISSIPATION OF INTERNAL
ENERGY IN A VIBRATING CANTILEVER BEAM REPRESENTED BY THE AREA OF THE
HYSTERESIS LOOP FORMED BY THE LOADING AND UNLOADING CURVES. IN A
CANTILEVER BEAM UNDERGOING FORCED TRANSVERSE VIBRATION, THE PHENOMENON
OF INTERNAL DAMPING APPEARS AS A SMALL NON-LINEAR TERM IN THE EQUATION
FOR THE ENERGY CONTAINED IN THE BEAM DUE TO THE DEFLECTION OF THE
BEAM. THE ENERGY LOSS PER CYCLE IN THE BEAM, MEASURED BY EXPERIMENTAL
TECHNIQUES, IS EQUAL TO THE AREA OF THE HYSTERESIS LOOP. THE EQUATIONS
OF THE HYSTERESIS LOOP CONTAIN PARAMETERS WHICH ARE CHARACTERISTIC OF
THE MATERIAL IN THE BEAM. A DETAILED EXPERIMENTAL STUDY, BASED ON THE
PRESENT ANALYSIS AND DESIGN, WILL DETERMINE THE NATURE AND
APPLICABILITY OF THE CHARACTERISTIC PARAMETERS.

269 420   0022   (THESES, *CANTILEVER BEAMS., *VIBRATION, *DAMPING, HYSTE
RESIS, TEST METH-ODS, TESTS, MATHEMATICAL ANALYSIS, DIFFER-ENTIAL EQUATI
ONS.) (*SATELLITE VEHICLES, DESIGN, THEORY, STRESSES, STRUCTURES.)   -

269 423   0024   A FEASIBILITY STUDY OF A MAGNETO-HYDRODYNAMIC
CENTRIFUGE.

269 423   0024   A STUDY WAS MADE OF THE MAGNETO-HYDRODYNAMIC
CENTRIFUGE, A DIRECT-CURRENT MOTOR WITH A MERCURY ARMATURE.
CENTRIFUGING ACTION IS DERIVED FROM THE ROTATING MERCURY WHICH, AT
SUFFICIENT SPEEDS, ASSUMES THE SHAPE OF A HOLLOW RING. A DEVELOPMENT
PROTOTYPE IS DESIGNED AND TESTED TO DETERMINE THE FEASIBILITY OF SUCH A
CENTRIFUGE. RESULTS WERE PROMISING AND INDICATED THAT THE BASIC
OPERATIONAL PRINCIPLE IS SOUND AND FEASIBLE. A PADDLE WHEEL WAS
ROTATED AT 2000 RPM BY A ROTATING RING OF MERCURY AT AN ESTIMATED
MERCURY INPUT POWER OF 5 WATTS.

269 423   0023   (*MAGNETOHYDRODYNAMICS, *CEN-TRIFUGES, THEORY, DESIGN,
MATHEMATICAL ANAL-YSIS, TESTS.) (DIRECT CURRENT, ELECTRIC MOTORS, MERCU
RY, ARMATURES, LIQUID METALS, VORTICES.) THESES.   -
269 426   0025   AUTOMATIC COMPUTATION OF ROOT LOCUS USING DIGITAL
COMPUTER.

269 426   0025   THE PROBLEM OF COMPUTING THE ROOT LOCUS IS
TRANSFORMED INTO THE FORMAT OF REPEATED SOLUTIONS OF THE CHARACTERISTIC
EQUATION EXPRESSED AS A POLYNOMIAL EQUATION OF DEGREE N.   TO RESOLVE
THE PROBLEM OF CONVERGENCE, A SIMULTANEOUS NEWTON-RAPHSON AND BAIRSTOW
ITERATION, WITH SUBSTITUTION OF VARIABLES WHEN REQUIRED, IS EMPLOYED TO
SOLVE THE POLYNOMIAL EQUATION. BY MEANS OF A SYSTEMATIZED ITERATIVE
PROCESS, A PROGRAM IS DEVELOPED IN FORTRAN LANGUAGE FOR THE IBM 1620
WHICH COMPUTES THE ROOT LOCUS AUTOMATICALLY. SEVERAL ROOT LOCI FORMED
BY PLOTTING THE ROOTS EVALUATED BY THE COMPUTER, WHICH ARE ACCURATE TO
AT LEAST FOUR FIGURES, ARE PROVIDED IN THE APPENDICES.

269 426   0024   (*DIGITAL COMPUTERS, AUTOMATION, *PROGRAMMING, POLYNOMI
ALS, PARTIAL DIFFERENTIAL EQUATIONS.) (DATA, TABLES.) (FEEDBACK, SERVO
 SYSTEMS.) THESES.   -
269 427   0026   A STUDY OF PARAMETRIC AMPLIFICATION.

269 427   0026   THE PARAMETRIC AMPLIFIER IS STUDIED BEGINNING WITH
SEVERAL MECHANICAL MODELS AND PROGRESSING TO SEVERAL PARALLEL RESONANT
ELECTRICAL CIRCUITS. TWO REGENERATIVE PARAMETRIC AMPLIFIERS, THE
DEGENERATE AND THE NON-DEGENERATE CASE, ARE ANALYZED BY LINEAR CIRCUIT
THEORY AND COMPARED TO THE NEGATIVE RESISTANCE AMPLIFIER. THE
MANLEY-ROWE ENERGY EQUATIONS ARE THEN DERIVED BY A SIMPLIFIED METHOD.
FINALLY, THE DEGENERATE CASE OF THE PARAMETRIC AMPLIFIER IS ANALYZED BY
THE MATHIEU EQUATION AND ON THE ANALOG COMPUTER.

269 427   0025   (*PARAMETRIC AMPLIFIERS, TUNED CIRCUITS, NEGATIVE RESIS
TANCE CIRCUITS, ENERGY, EQUATIONS, DIFFERENTIAL EQUATIONS, MATHEMATI-CAL
 ANALYSIS, THEORY, THESES.) (AMPLIFIERS, SIMULATION, ANALOG COMPUTERS.)
        -

269 430   0027   DIRECT USE OF SOLAR-ENERGY FOR COMMUNICATION. PART
I. ANALYSIS OF SOLAR-OPTICAL COMMUNICATION.

269 430   0027   THE ANALYTICAL PART OF THE SOCOM (SOLAR OPTICAL
COMMUNICATIONS) PROGRAM CONSISTED OF STUDIES OF THE THEORETICAL AND
PRACTICAL LIMITATIONS OF SPACE COMMUNICATION SYSTEMS USING SUNLIGHT AS
A CARRIER, TOGETHER WITH EXPLORATION OF WAYS OF SIMULATING AND TESTING
SUCH SYSTEMS ON THE EARTH. THE AREAS STUDIED INCLUDED WAVELENGTH
SPECTRUM, OPTICAL SYSTEMS, MODULATION AND DEMODULATION TECHNIQUES,
TRACKING AND STABILIZATION PROBLEMS, SYSTEM DESIGN, AND SIMULATION
TECHNIQUES.

269 430   0026   (*LIGHT COMMUNICATION SYSTEMS, SOLAR ENERGY, FEASIBILIT
Y STUDIES.) (SPACE FLIGHT, COMMUNICATION SYSTEMS.)   –
269 484   0028   EXPERIMENTAL VERIFICATION OF THE FRICTIONAL PRESSURE
DROP THROUGH POROUS MEDIA,

269 484   0028   THE FRICTIONAL PRESSURE DROP ACROSS A POROUS   (36$)
PEBBLE BED WAS MEASURED. THE RATIO OF BED-TO-PEBBLE DIAMETER WAS 72,
SPHERICITY OF THE PEBBLES WAS 1, AND AIR FLOW RATES VARIED FROM 0.13 TO
1.3 LB/SEC-SQ FT, BASED ON THE BED AREA. THE DATA OBTAINED IS COMPARED
TO THE DATA PREDICTED BY G. G. BROWN, AND TO THE WORK OF P. C. CARMAN,
D. E. RANDALL, AND S. S. MILLWRIGHT. PEBBLE MOTION WITHIN THE BED AND
THE EFFECT OF THE METHOD OF FLOW INITIATION ON THE FRICTIONAL PRESSURE
DROP WERE ALSO INVESTIGATED.

269 484   0027   (*POROUS MATERIALS, *AIR INTAKE FILTERS, ROCK, PRESSURE
, FLUID FLOW, MOTION, FRICTION.) (EXPERIMENTAL DATA, TEST EQUIPMENT, TE
STS.)   –
269 486   0029   THE POSITIONAL ACCURACY OF MAPS,

269 486   0029   IN THE POSITIONAL EVALUATION OF FOREIGN MAPS, THE
SCALED POSITIONS OF HORIZONTAL CONTROL ARE COMPARED WITH AVAILABLE
COORDINATES, AND FROM THE DIFFERENCES THE ROOT-MEAN-SQUARE ERROR OF
SCALED POSITIONS IS COMPUTED.

269 486   0028   (*NUMERICAL ANALYSIS, ERRORS, *TERRAIN, *MAPS, *POSITIO
N FINDING, AERIAL PHOTOGRAPHS.) (AERIAL PHOTOGRAPHY, MAPPING, MILITARY
INTELLIGENCE.)   –
269 324   0031   REMARKS ON GENERAL TAUBERIAN THEOREMS,

269 324   0031   LET K(X) BE A FUNCTION OF THE CLASS L1(K(X) DX
), AND H(X) A BOUNDED FUNCTION ON THE REAL LINE. CONSIDER THE FUNCTION
H(X)   K(X-Y)H(Y)DY. IN THE THEORY OF GENERAL TAUBERIAN THEOREMS,
THE BEHAVIOUR OF H(X), WHEN X TENDS TO INFINITY, IS CONSIDERED. WIENER
USING THE THEORY OF FOURIER TRANSFORMS, PROVED THAT IN CERTAIN CASES
THE EXISTENCE OF THE LIMIT LIM H(X) FOR A PARTICULAR FUNCTION K L1,
IMPLIES THE EXISTENCE OF THE SAME LIMIT FOR ALL FUNCTIONS OF THE CLASS
L1. THE MAIN WIENER'S TAUBERIAN THEOREM IS PRESENTED.

269 324   0030   (*SERIES, INTEGRAL TRANSFORMS, TAYLOR   S SERIES, INEQUA
LITIES.)   –

269 400   0032   APPRAISAL OF VARIOUS MECHANICAL TRANSMISSIONS,
APPENDIX 13.

269 400   0032   AN APPRAISAL IS MADE OF VARIOUS MECHANICAL MEANS OF
TRANSFORMING THERMAL POWER INTO HYDRAULIC POWER, I.E., STEAM ENERGY
INTO SHIP THRUST. THE STEAM MOTOR DIRECT DRIVE FOR A PROPELLER MAKES A
VERY ATTRACTIVE TRANSMISSION. IT IS BEING EXPLORED IN DETAIL UNDER A
SEPARATE PHASE OF THE PROGRAM. THE TORQUE CONVERTER DEVELOPMENT COULD
RESULT IN SUBSTANTIALLY IMPROVED PROPULSION SYSTEMS WITH EITHER TURBINE
OR RECIPROCATING STEAM PRIME MOVERS. OTHER MECHANICAL TRANSMISSION
SCHEMES WHICH WERE INVESTIGATED INCLUDE (1) HYDRAULIC SPLIT
TRANSMISSIONS USING BOTH HYDROKINETIC AND HYDROSTATIC ELEMENTS (2)
BELT DRIVES AND (3) VARIABLE PITCH PROPELLERS. HYDRODYNAMIC SHEAR
DRIVES ARE BEING EVALUATED SEPARATELY. OF THE TRANSMISSION CURRENTLY
THOUGHT FEASIBLE, THE FOTTINGER TRANSFORMER AND THE STEAM MOTOR
DIRECT-DRIVE OFFER THE GREATEST INCENTIVE FOR FURTHER INVESTIGATION.

269 400   0031   (*TRANSMISSIONS, AUTOMATIC TRANSMISSIONS, TORQUE COUPLI
NGS, EXTERNAL COMBUSTION ENGINES, STEAM TURBINES, GENERA-TORS, MAIN PROP
ULSION PLANTS, SUBMARINE EN-GINES, *NUCLEAR PROPULSION, UNDERWATER PROPU
L-SION, ELECTRIC PROPULSION, MARINE PROPELLERS, VARIABLE PITCH PROPELLER
S, SUBMARINES.)   —
269 401   0033   CONDENSER ANALYSIS, APPENDIX 14.

269 401   0033   NO ABSTRACT AVAILABLE

269 401   0032   (STEAM TURBINES, GENERATORS, SHIP TURBINES, STEAM POWER
 PLANTS, *STEAM CONDENSERS, CONDENSER TUBE EXPANDERS, CON-FIGURATION, DE
SIGN.) .*NUCLEAR PROPULSION, ELECTRIC PROPULSION, MAIN PROPULSION PLANT
S, SUBMARINES.)   —
269 402   0034   MACHINERY SYSTEMS AND CONTROL CONSIDERATIONS,
APPENDIX 15.

269 402   0034   CONSIDERATION IS GIVEN TO EQUIPMENT AND PROCEDURES
THAT WILL PROVIDE SUBMARINE MACHINERY FOR PROPULSION, AUXILIARY, AND
HOTEL SERVICE THAT WILL BE CHARACTERIZED BY (1) LOW MAINTENANCE
AFLOAT (2) REDUCE SURVEILLANCE AFLOAT (3) FAILSICK IN PLACE OF
FAIL-DEAD CHARACTERISTIC (4) REDUCED MAN-HOURS AND DOWN TIME FOR MOST
PROBABLE SERVICE (5) REDUCED SKILLTO OPERATE, SUPERVISE,
TROUBLE-SHOOT, AND REPLACE (6) REDUCED APPARENT COMPLEXITY THRU
PACKAGED COMPONENTS AND FUNCTIONS (7) ENHANCED EFFICIENCY TO PROLONG
CRUISES AND (8) CAPABILITY TO OPERATE AT ALL SPEEDS AT ALL DEPTHS AND
UNDER HIGH SHOCK LOADS.

269 402   0033   (*CONTROL SYSTEMS, PNEUMATIC SYSTEMS, HYDRAULIC SYSTEMS
, *SERVOMECHANISMS, *ELECTRIC SERVOMECHANISMS, *HYDRAULIC SERVO-MECHANIS
MS, *PNEUMATIC SERVOMECHANISMS, PRES-SURE REGULATORS, *VALVES, *CONTROL
VALVES, SAFETY VALVES, THERMOSTATIC VALVES, *EXTERNAL COMBUSTION ENGINES
, *STEAM TURBINES, GENER-ATORS, MAINTENANCE, RELIABILITY, DESIGN, FEA-SI
BILITY STUDIES.) (MAIN PROPULSION PLANTS, SUBMARINE ENGINES, UNDERWATER
 PROPULSION, *NUCLEAR PROPULSION, ELECTRIC PROPULSION, SUBMARINES.)   —

269 404   0035   DEVELOPMENT OF AN IMPROVED JAN 6299.

269 404   0035   THE STUDY TO EVALUATE CERTAIN AREAS OF ADVANCED TUBE
MANUFACTURING TECHNIQUES AND TO APPLY THEM WHERE FEASIBLE TO THE JAN
6299 WAS CONTINUED. TABLES ARE PRESENTED LISTING ECCENTRICITY DATA AND
HUMIDITY TEST RESULTS FOR PRESENT PRODUCTION TUBES. A DESCRIPTION OF
THE PROPOSED REDESIGN OF THREE SEALS FROM LEAD TO HARD SOLDER IS
INCLUDED. LIFE RESULTS OF THE CATHODE SPRAY DENSITY EVALUATION ARE
SUMMARIZED.

269 404   0034   (*ELECTRON TUBES, SEALS, COAT-INGS, DESIGN, PROCESSING,
*MANUFACTURING METHODS, LIFE EXPECTANCY, HUMIDITY, TESTS.)   -
269 888   0036   DETERMINATION OF THE SURFACE TEMPERATURE OF WATER
DURING EVAPORATION STUDIES. A COMPARISON OF THERMISTOR WITH INFRARED
RADIOMETER MEASUREMENTS.

269 888   0036   THE TEMPERATURE OF A WATER SURFACE WAS MEASURED BY
TWO TECHNIQUES, ONE UTILIZING A COMMERCIAL IR RADIOMETER, AND THE
OTHER, THERMISTOR PROBES. BOTH METHODS WERE SATISFACTORY FOR FOLLOWING
THE CHANGES IN SURFACE TEMPERATURE DURING EVAPORATION STUDIES. THE
RADIOMETER WAS LESS SENSITIVE TO CHANGES IN TEMPERATURE THAN THE
THERMISTORS, BEING LIMITED TO CHANGES IN TEMPERATURE OF 0.1 C OR
GREATER. THE RADIOMETER HAS THE ADVANTAGE OF MEASURING THE TEMPERATURE
OF A MUCH THINNER LAYER OF WATER NEAR THE SURFACE THAN THE THERMISTOR
(0.1 MM AS COMPARED TO 2 OR 3 MM). IT ALSO RESPONDS MORE RAPIDLY TO
CHANGES IN WATER TEMPERATURE THAN THE THERMISTOR AND DOES NOT REQUIRE
CONTACT WITH THE WATER.

269 888   0035   (*WATER, EVAPORATION, *SURFACE TEMPERATURES, THIN FILMS
, MONOMOLECULAR FILMS, TEMPERATURE, MEASUREMENT, *THERMISTORS, RESIST-AN
CE THERMOMETERS, *RADIOMETERS, INFRARED RADIATION, SENSITIVITY.)   -
269 891   0037   ON THE DESIGN OF A HIGHLY RELIABLE HF DIGITAL
COMMUNICATION SYSTEM. PROBLEMS, DESIGN PROCEDURES AND THE DESCRIPTION
OF A PROPOSED DESIGN,

269 891   0037   FOR THE OPTIMUM DESIGN OF A DIGITAL HF SYSTEM USING
PULSE REDUNDANCY, IT WAS CONCLUDED THAT STATISTICAL INFORMATION ON THE
CORRELATION BETWEEN DISTURBANCES MUST BE KNOWN. THIS INFORMATION IS
NOT AVAILABLE. FROM OTHER INFORMATION AND BY ANALOGY, IMPORTANT DESIGN
CHARACTERISTICS AND REQUIREMENTS FOR AN OPTIMUM DESIGN CAN BE
QUALITATIVELY EXTRAPOLATED (1) WIDE BANDWIDTH (GREATER THAN 3 KC) TO
PERMIT EFFECTIVE UTILIZATION OF FREQUENCY DIVERSITY, (2) INTERLEAVING
OF SUB-BITS FROM VARIOUS INFORMATION-BITS TO PERMIT EFFECTIVE
UTILIZATION OF TIME DIVERSITY, (3) USE OF SHORT-DURATION PULSES
FOLLOWED BY LONG DEAD PERIODS TO PROVIDE HIGH POTENTIAL PROTECTION
AGAINST MULTIPATH DISTORTION BY SELFINTERFERENCE, AND (4) USE OF A
DEMODULATION TECHNIQUE WHICH UTILIZES, RATHER THAN REJECTS, MULTIPATH
SIGNAL CONTRIBUTIONS. HOWEVER, IT WAS ALSO CONCLUDED THAT IT IS
ENTIRELY FEASIBLE TO DESIGN AND BUILD A 3 KC BANDWIDTH SYSTEM WHICH
WILL OFFER SUBSTANTIAL PERFORMANCE ADVANTAGES OVER AN FSK (FREQUENCY
SHIFT KEYING) SYSTEM.

269 891   0036   (DESIGN OF HIGH FREQUENCY, AIR TO SURFACE, *RADIO COMMU
NICATION SYSTEMS, *DATA TRANSMISSION SYSTEMS, *DIGITAL SYSTEMS.) (MULTIP
ATH TRANSMISSION, FREQUENCY SHIFT KEYERS, DIVERSITY RECEPTION, DIVERSITY
SYS-TEMS.)   -

269 487   0038   CONTROL PERFORMANCE UNDER ACCELERATION WITH SIDEARM
ATTITUDE CONTROLLERS,

269 487   0038   THIS PAPER PRESENTS PROCEDURES, DATA, AND
CONCLUSIONS BASED ON CLOSED-LOOP CENTRIFUGE EXPERIMENTS IN WHICH
SIDE-ARM CONTROLLERS WERE USED BY PILOTS TO PERFORM SPECIFIC CONTROL
TASKS.   UNDER CERTAIN CONDITIONS THE PILOTS COULD PERFORM AS WELL IN
ADVERSE ACCELERATION FIELDS AS THEY COULD STATICALLY, EVEN THOUGH THEY
WERE EXERTING MORE PHYSICAL EFFORT AND PSYCHOLOGICAL CONCENTRATION, AND
WERE ENDURING VISUAL IMPAIRMENT, CHEST PAINS, BREATHING DIFFICULTIES,
AND OTHER STRESSFUL EFFECTS OF ACCELERATION. THE PILOTS DEMONSTRATED A
REMARKABLE ABILITY TO ADAPT TO PHYSIOLOGICALLY SEVERE ACCELERATION
ENVIRONMENTS, AND THEY MAINTAINED CONTROL PERFORMANCE WITHIN
ACCELERATION TIME HISTORY PROFILES WHICH CONTAINED VECTORS WITH
AMPLITUDES AS HIGH AS 15 G (CHEST TO BACK), -7 G (BACK TO CHEST), AND
   7 G (HEAD TO FOOT). SOME CLOSED-LOOP HUMAN CENTRIFUGE SIMULATIONS
WERE CONDUCTED WHICH PROVIDED HUMAN FACTORS DATA WHICH MAY HAVE
APPLICATION TO THE DESIGN AND EVALUATION OF SIDE-ARM CONTROLLERS FOR
USE WITHIN PROPOSED SPACE VEHICLES.

269 487   0037   (*ACCELERATION TOLERANCE, CENTRIFUGES, LABORATORY EQUI
PMENT, PILOTS, STRESS (PHYSIOLOGY), STRESS (PSYCHOLOGY), CONTROL, EFFECT
IVENESS, SIMULATION.)   -
269 497   0039   BIBLIOGRAPHY OF PUBLICATIONS.   SUPPLEMENT I.

269 497   0039   NO ABSTRACT AVAILABLE

269 497   0038   (*GEOPHYSICS, *ALASKA, GEO-PHYSICAL PROSPECTING, EARTHQ
UAKES, *BIBLIOGRAPHY.)   -
269 498   0040   HIGH LATITUDE GEOPHYSICAL DATA FOR AUGUSTSEPTEMBER
1961.

269 498   0040   NO ABSTRACT A VAILABLE

269 498   0039   (*GEOPHYSICS, *DATA, TABLES, ALASKA.)   (EARTH, ELECTRIC
 CURRENTS, *TER-RESTRIAL MAGNETISM, NOISE (RADIO), SOLAR NOISE, EXTRATER
RESTRIAL RADIO WAVES, ABSORPTION BY IONOSPHERE, AURORAE, RADAR ECHO AREA
S, DIURNAL VARIATIONS, PERIODIC VARIATIONS, TABLES.)   -
269 499   0041   DIAGNOSTICS OF A PLASMA FLAME EXHAUSTING TO
ATMOSPHERIC PRESSURE,

269 499   0041   A SPECTROMETRIC METHOD TO MEASURE TEMPERATURE IN A
HIGH TEMPERATURE GAS STREAM PRODUCED BY A GERDIEN-TYPE ARC PLASMA
GENERATOR WAS DEVELOPED. THE FOWLER-MILUE PEAKING FUNCTION METHOD WAS
EMPLOYED WHICH UTILIZED BOTH THE SPECTRAL LINE AND CONTINUUM RADIATION
IN THE 4000 A RANGE FROM AN ARGON PLASMA. EXCITATION TEMPERATURES
MEASURED FROM LINE RADIATION AND ELECTRON TEMPERATURES DETERMINED FROM
THE CONTINUUM RADIATION AGREED WITHIN ABOUT FIVE PERCENT. THE METHOD
WAS APPLICABLE PROVIDED TEMPERATURES LARGER THAN 16,000 K EXISTED AT
THE CENTER OF THE AXISYMMETRIC JET THE RANGE OF TEMPERATURE
MEASUREMENT WAS THEN FROM ABOUT 7000 TO 28,000 K. COMPARISON OF THE
AVERAGE TEMPERATURE OBTAINED USING THE SPECTROMETRIC METHOD WITH THE
AVERAGE TEMPERATURE OBTAINED USING AN ENERGY BALANCE INDICATED SERIOUS
DISAGREEMENT. COMPARISON OF THE TOTAL ENTHALPY OBTAINED USING THE

SPECTRAL TEMPERATURE WITH THAT OBTAINED FROM THE ENERGY BALANCE ALSO
INDICATED DISAGREEMENT. THE REASON FOR THE DISAGREEMENT WAS THAT THE
JET CONSISTED OF HIGH FREQUENCY ARC CHANNELS MOVING ABOUT IN THE STREAM
AND THAT THE RADIANT EMISSION RESULTED FROM THESE HIGH TEMPERATURE
ELECTRONS RATHER THAN FROM THE AVERAGE GAS ATOMS.

269 499   0040   (PLASMA PHYSICS, *PLASMA JETS, GAS IONIZATION, HELIUM,
*ARGON, TEMPERATURE, MEASUREMENT, INSTRUMENTATION, SPECTROGRAPHIC ANALYS
IS.) (PLASMA JETS, EXHAUST GASES, EXHAUST FLAMES, THERMAL RADIATION, MA
THEMATICAL ANALYSIS.)   -
269 504   0042   INFRARED FIBER OPTICS.

269 504   0042   VITREOUS INFRARED TRANSMITTING MATERIALS WERE DRAWN
INTO COATED AND UNCOATED FIBERS BY EMPLOYING TECHNIQUES DEVELOPED FOR
THE FORMATION OF VISIBLE RADIATION TRANSMITTING GLASS COATED-GLASS
FIBER. INFRARED TRANSMITTING FIBER WAS FABRICATED FROM GERMANATE,
SILICATE AND ARSENIC TRISULFIDE. CRYSTALLINE SODIUM CHLORIDE WAS
EXTRUDED INTO RELATIVELY LARGE DIAMETER FIBER. PLASTIC MATERIALS SUCH
AS THE EPOXIES AND LUCITE ARE SHOWN TO BE SUITABLE POTTING MATERIALS
FOR UNCOATED FIBER. ABSORPTION BANDS OF THESE MATERIALS DO NOT
SERIOUSLY INFLUENCE THE TRANSMITTED RADIATION, HOWEVER, COMPOUNDS
HAVING FEW ABSORPTION BANDS ARE TO BE FAVORED. THE PERFORMANCE OF
FIBERS OF DIAMETER COMPARABLE TO THE WAVELENGTH OF THE TRANSMITTED
RADIATION IS ANALYZED BY USING DIELECTRIC WAVEGUIDE THEORY, AND THE
RESULTS ARE INTERPRETED FROM THE OPTICAL VIEWPOINT OF THIN FILM
INTERFERENCE AND FRUSTRATED TOTAL REFLECTION.

269 504   0041   (*INFRARED OPTICAL SYSTEMS, FIBERS, OPTICS, *WAVE TRANS
MISSION, INFRARED OPTICAL MATERIALS, INFRARED RADIATION, IN-FRARED DETEC
TORS.) (COATINGS, ARSENIC COM-POUNDS, SULFIDES, MAGNESIUM, OXIDES, POLY
MERS, STYRENES, SILVER, CHLORIDES, EPOXY RESINS, ACRYLIC RESINS.) (INST
RUMENTATION, DESIGN, OPTICAL COATINGS, WAVEGUIDES, THEORY, DI-ELECTRICS,
ENERGY.)   -
269 507   0043   STUDY OF A CARBON DIOXIDE REDUCTION SYSTEM.

269 507   0043   AN ENGINEERING MODEL OF A SYSTEM FOR REDUCING CO2
AT A RATE OF 500 CC/MIN BY REACTION WITH H OVER HEATED CATALYSTS WAS
DEVELOPED. THE PRIMARY PRODUCTS OF THE REACTION WERE SOLID C AND WATER
VAPOR. TO RECOVER BREATHABLE O, CONDENSED WATER VAPOR WOULD BE FED TO
AN ELECTROLYSIS CELL THE H BY-PRODUCT OF THE ELECTROLYSIS WOULD THEN
BE USED TO REDUCE MORE CO2. SOLID CARBON IS REMOVED PERIODICALLY FROM
THE APPARATUS AND DISCARDED. IN THE FINAL TEST, THE APPARATUS WAS
OPERATED CONTINUOUSLY FOR A PERIOD OF 11 HR. AT ABOUT 10$ ABOVE THE
TARGET CONVERSION RATE. WE ESTIMATE THAT THE C DEPOSITS COULD BE
ACCUMULATED FOR AT LEAST 2 DAYS IN THE PRESENT REACTOR BEFORE
INTERRUPTING THE PROCESS FOR REMOVAL OF C AND RENEWAL OF CATALYST.
WITH APPROPRIATE MAINTENANCE PROCEDURES, THE APPARATUS SHOULD OPERATE
FOR THE SPECIFIED MAXIMUM OF 3 YR WITHOUT DIFFICULTY.

269 507   0042   (*CARBON DIOXIDE, *DECOMPOSITION, *REDUCTION, HIGH TEMP
ERATURE RESEARCH, RADIA-TION EFFECTS, PHOTOCHEMISTRY, ALKALI METALS, ALK
ALI METAL COMPOUNDS, HYDRIDES, HYDROGEN, CATALYSIS, CATALYSTS, IRON, WAT
ER, SEPARATION, CARBON DEPOSITS.) (WATER, ELECTROLYSIS.) (SPACESHIPS, S
ATELLITE VEHICLES, *AIR CON-DITIONING EQUIPMENT, PRODUCTION, OXYGEN.)

269 557   0044   EXPERIMENTS IN THE IMPROVEMENT OF THE IMPULSE
RESPONSE OF TELEPHONE CIRCUITS,

269 557   0044   THE PROBLEM OF SHORTENING THE DURATION OF THE
TELEPHONE CIRCUIT IMPULSE RESPONSE BY FILTERING IS CONSIDERED. IT IS
SHOWN THAT HIGH-PASS FILTERING ACHIEVES THE DESIRED RESULT WITH AN
ATTENDANT LOSS IN CIRCUIT BANDWIDTH, WHILE PERFECT PHASE EQUALIZATION
(MATCHED FILTERING) OBTAINS BETTER RESULTS WITH NO LOSS IN BANDWIDTH.
IT IS ALSO SHOWN THAT MATCHED FILTERING RESULTS IN A MORE DESIRABLE
PULSE THAN IS OBTAINED BY THE COMBINATION OF BOTH MATCHED AND HIGH-PASS
FILTERING.

269 557   0043   (*HIGH PASS FILTERS, *TELEPHONE COMMUNICATION SYSTEMS,
MULTICHANNEL TELEPHONE SYSTEMS, CIRCUITS.) (PULSE TRANSMITTERS, PHASE M
ODULATION, *SIGNAL-TO-NOISE RATIO.) (DATA TRANSMISSION SYSTEMS, TELEPHON
E LINES, TELEPHONE SIGNALS, ATTENUATION.)   —
269 561   0045   RESEARCH ON MAGNETIC ROD STORAGE AND CONTROL UNITS
FOR A SWITCHING CENTRAL OFFICE.

269 561   0045   WORK WAS CONTINUED ON THE DESIGN OF A HIGH-SPEED,
DIGITAL SWITCHING CENTRAL SYSTEM WITH A MINIMUM USE OF SEMI-CONDUCTOR
DEVICES AND A MAXIMUM UTILIZATION OF THE MAGNETIC ROD AS A LOGICAL AND
STORAGE ELEMENT. DIGITAL SWITCHING TECHNIQUES COMBINED WITH AN
EFFICIENT USE OF THE MAGNETIC ROD WILL RESULT IN A SWITCHBOARD DESIGN
WITH HIGH RELIABILITY, COUPLED WITH MINIMAL SIZE, WEIGHT, AND COST. A
DESCRIPTION OF THE MODIFIED TIMING CYCLE FOR THE DIGITAL SWITCHING
CENTRAL IS PRESENTED. MAGNETIC LOGIC MIRROR NOTATION IS DESCRIBED.
MAJOR PORTIONS OF THE ROMOTE CONCENTRATOR ARE PRESENTED IN DETAIL.

269 561   0044   (*TELEPHONE COMMUNICATION SYS-TEMS, DIGITAL SYSTEMS, SW
ITCHING CIRCUITS, PANEL BOARDS (ELECTRICITY), MULTIPLEX TRANS-MISSION, S
TORAGE, CONTROL, DESIGN.) (*MULTI-CHANNEL TELEPHONE SYSTEMS, DATA TRANS
MISSION SYSTEMS, ELECTRONIC SWITCHES, TIME INTERVAL COUNTERS, *MAGNETIC
CORE SWITCHES.)   —
269 562   0046   TRANSIENT ANALYSIS OF INTERACTING DYNAMICAL SYSTEMS
BY THE PRINCIPLE OF ENERGY TRANSFORMATION,

269 562   0046   AN ENERGY TRANSFORMER IS DEFINED AS A REVERSIBLE
DEVICE WHICH CONVERTS FREE ENERGY OF ONE FORM INTO ANOTHER AND VICE
VERSA. BASIC TRANSFORMER EQUATIONS ARE DERIVED FOR THESE DEVICES WHICH
ARE GOOD FOR BOTH STEADY-STATE AS WELL AS TRANSIENT OPERATIONS. USING
THE TRANSFORMER ANALOGY, INTERACTING SYSTEMS CAN BE REPRESENTED BY A
SINGLE EQUIVALENT CIRCUIT FROM WHICH TRANSIENT AND STEADY-STATE
RESPONSES AND INTERACTING EFFECTS CAN BE CALCULATED. THE METHOD IS
APPLICABLE TO NONLINEAR AS WELL AS LINEAR SYSTEMS. EXAMPLES ARE GIVEN
TO ILLUSTRATE ITS APPLICATIONS IN ELECTROMECHANICAL AND HYDROMECHANICAL
SYSTEMS.

269 562   0045   (ENERGY, *TRANSFORMERS, TRANS-DUCERS, *ELECTROMECHANICA
L CONVERTERS, CIR-CUITS, ELECTRICAL NETWORKS.) (N ON-LINEAR DIFFERENTI
AL EQUATIONS, LINEAR SYSTEMS.)   —

269 568   0047   THEORY OF OPTIMUM MULTIPLE MEASUREMENTS.-

269 568   0047   MULTIPLE MEASUREMENTS WITH RANDOM INPUTS ARE
STUDIED. METHODS OF WEIGHTING AND COMBINING THE MEASURED SIGNALS ARE
PROPOSED. THE RELATIONSHIPS BETWEEN THE MEASURED SIGNALS AND THE
DESIRED SIGNAL ARE ASSUMED LINEAR AND TIME-INVARIANT THE RANDOM
INPUTS ARE ASSUMED STATIONARY WITH RATIONAL SPECTRAL DENSITY
FUNCTIONS THE CRITERION OF PERFORMANCE USED IS TO MINIMIZE THE MEAN
SQUARED VALUE OF THE CONTINUOUS ERROR BETWEEN THE ESTIMATE AND THE
DESIRED SIGNAL AND THE WEIGHTING OPERATIONS ARE ASSUMED LINEAR. TWO
KINDS OF SINGLE-RATE SYSTEMS ARE STUDIED SINGLE-RATE MULTIPLE
MEASUREMENTS WITH KNOWN SPECTRAL DENSITY FUNCTIONS OF SIGNAL AND NOISE,
AND SINGLE-RATE MULTIPLE MEASUREMENTS WITH KNOWN NOISE BUT UNKNOWN
SIGNAL SPECTRAL DENSITY FUNCTIONS. A NEW METHOD EMPLOYING THE
FREQUENCY DOMAIN OPTIMIZATION THEOREMS TOGETHER WITH FACTORIZATION
THEOREMS OF RATIONAL MATRICES IS PROPOSED FOR OBTAINING THE OPTIMUM
SYSTEM OF THE FIRST KIND.

269 568   0046   (*INTEGRAL TRANSFORMS, INTEGRAL EQUATIONS, MATRIX ALGEB
RA, SPECTROGRAPHIC ANALYSIS.) (RADIO SIGNALS, NOISE (RADIO), INFORMATIO
N THEORY.) THESES.   -
269 570   0048   ELEMENTARY LATTICE THEORIES AND THEIR APPLICATION TO
GAS ADSORPTION PHENOMENA,

269 570   0048   A REVIEW OF CERTAIN LATTICE THEORIES IS PRESENTED
FOR DERIVING FLORY'S FORMULA FOR THE FREE ENERGY OF A SOLUTION
CONSISTING OF MONOMER AND POLYMER MOLECULES. THE RESULTS ARE THEN
REFORMULATED, MAKING THEM APPLICABLE TO SIMPLE LIQUIDS REQARDED AS A
BINARY MIXTURE OF HIGHLY SYMMETRIC MOLECULES AND FRACTIONAL-SIZED
HOLES. THESE RESULTS ARE ADAPTED TO PROVIDE A THEORY OF GAS
ADSORPTION IN WHICH THE FRACTIONAL HOLE SIZE CONCEPT IS UTILIZED. ONE
OBTAINS ISOTHERM EQUATIONS AND EXPRESSIONS FOR THE PARTIAL MOLECULAR
CONFIGURATIONAL ENTROPIES IN WHICH THE HOLE SIZE PARAMETER R MAKES ITS
APPEARANCE. FOR R EQUALS 1, THE RESULTS REDUCE TO THE ZERO-ORDER
FOWLER-GUGGENHEIM RESULTS IT IS POINTED OUT THAT CERTAIN SYMMETRY
PROPERTIES NO LONGER OBTAIN WHEN R EXCEEDS 1. THE THEORY IS COMPARED
WITH EXPERIMENTAL WORK ON CERTAIN TYPES OF ADSORBENT-ADSORBATE
SYSTEMS.

269 570   0047   (*LATTICES, THEORY, *LIQUIDS, *GASES, *SOLIDS, ABSORPTI
ON, PHYSICAL PROP-ERTIES.) (MOLECULES, PARTICLES, VELOCITY, DENSITY, EN
TROPY.) (*QUANTUM STATISTICS, PROBABILITY, INTEGRATION, STATISTICAL DI
STRIBUTION.)   -
269 574   0049   QUANTUM DETECTOR FOR MEASUREMENT OF EED BRIDGE WIRE
TEMPERATURE RISE.

269 574   0049   THE CONSTRUCTION AND TESTING OF AN EXPERIMENTAL
MODEL SQUIB QUANTUM DETECTOR IS DISCUSSED. A SECOND EXPERIMENTAL MODEL
WAS ALSO STARTED. IN THIS MODEL, THE MIRROR AND THE DETECTOR WAS LEFT
UNCEMENTED SO THAT ALIGNMENT COULD BE MADE BY ELECTRICAL MEANS.
CERTAIN DESIGN CHANGES WERE ALSO MADE. TWO HOLES WERE DRILLED THROUGH
THE SQUIB PLUG AND THE MICRODOT SHIELDED CABLES WERE CEMENTED INTO
THESE HOLES. THE ELECTRICAL CONNECTIONS FROM THE DETECTOR AND THE
VIBRATOR COIL COULD BE MADE WITH FINE WIRES SOLDERED TO THE MICRODT
CABLE, WHICH WAS RIGIDLY CEMENTED INTO THE PLUG.

269 574 ·0048   (*ELECTRIC DETONATORS, *ELECTRIC IGNITERS, ELECTRIC BRI
DGE , EMPERA RE E ECT   G ETI   TS, L T   W R , AZARD , DE E

CTORS, OPTICAL EQUIPMENT, *TEMPER-ATURE WARNING SYSTEMS, DESIGN, SENSITI
CTORS, OPTICAL EQUIPMENT, *TEMPER-ATURE WARNING SYSTEMS, DESIGN, SENSITI
VITY, TESTS.)   -
269 577   0050   BALLISTIC PROTECTIVE BUOYANT MATERIALS.

269 577   0050   ORLON NEEDLED BATTS WHICH WERE COMMERCIALLY
PROCESSED WERE INEFFECTIVE BUOYANTLY. ADDITIONAL CURING UPGRADED THE
MATERIAL SLIGHTLY BUT A SUBSTANTIAL INCREASE IN THE BUOYANCY WAS
OBTAINED BY COMPARTMENTATION (USING 6-IN. STRIPS OF THE ORLON BATT
SEPARATED BY PLASTIC FILM TO FORM LARGER SECTIONS). THE EFFECT OF
VARIOUS SURFACE FINISHES ON THE BALLISTIC PERFORMANCE OF 42 OZ/SQ YD
BATTS CONTAINING ORLON STAPLE WAS INVESTIGATED. THE 3 FINISHES STUDIED
WERE THE MANUFACTURER'S ORIGINAL ANTI-STATIC AGENT, HYDROPHOBED AEROGEL
AND DECETEX-104 SILICON WATER-REPELLENT. THE ABILITY OF THE BATTS TO
WITHSTAND FRAGMENT PENETRATION INCREASED AS THE FIBER-TOFIBER FRICTION
DECREASED. A COMPARISON OF THE BALLISTICS OF 2 TYPES OF DACRON
STAPLES, HYDROPHOBED, WAS OBTAINED. TYPE 5400 WAS VASTLY SUPERIOR TO
TYPE 64. A 50/50 BLEND OF HYDROPHOBED ACRILAN AND DACRON WAS EQUAL
BALLISTICALLY TO A 50/50 COMPOSITE OF THE SAME MATERIALS.

269 577   0049   (*BUOYANT MATERIALS, *PROTECTIVE CLOTHING, TERMINAL BAL
LISTICS.) (FIBERS, SYNTHETIC FIBERS, TEXTILES, *DACRON, *ORLON, *NYLON,
 RESINS, ACRYLIC RESINS, FLOTATION, CLEANING.) (FRAGMENTATION, PENETRAT
ION, TESTS.) (*BODY ARMOR, MATERIALS.)   -
269 583   0051   STARK EFFECTS IN THE NEAR INFRARED SPECTRA OF SIMPLE
POLYATOMIC MOLECULES,

269 583   0051   A SURVEY WAS MADE OF STARK EFFECTS IN THE
VIBRATION-ROTATION SPECTRA OF SIMPLE POLYATOMIC MOLECULES. EMPLOYING A
LIGHT GUIDE TYPE STARK ABSORPTION CELL 90 CM LONG HAVING FRONT SURFACED
MIRRORS AS PARALLEL PLATE ELECTRODES, FIELDS OF 120 KV/CM COULD BE
OBTAINED WITH SAMPLE PRESSURES 1/4 MM HG. THE ELECTRODE SPACING OF 0.2
TO 0.5 MM WAS EVALUATED BY EXAMINING THE FRINGE SYSTEMS PRODUCED UPON
PASSING LIGHT THROUGH THE CELL PERPENDICULAR TO ITS OPTICAL AXIS. FOR
THIS PURPOSE, PARTIALLY TRANSPARENT MIRROR ELECTRODES WERE USED. AN
EBERT-FASTIE SPECTROMETER OF THREE METER FOCAL LENGTH AND EQUIPPED WITH
A 300 LINE/MM GRATING 200 MM LONG AFFORDED A RESOLVING POWER IN EXCESS
OF 75,000 WHEN USED DOUBLE PASSED. LIQUID AIR COOLED PBS DETECTORS
AND SYNCHRONOUS AMPLIFIERS WERE USED.

269 583   0050   (*ATOMIC SPECTRUM, *ELECTRIC FIELDS, *INFRARED SPECTROS
COPY, *MOLECULES.) (DIPOLE MOMENTS, POLARIZATION, QUANTUM MECHANICS, ENE
RGY.) (OPTICS, LIGHT TRANSMIS-SION, OPTICAL EQUIPMENT, MOLECULAR BEAMS.
) (COATINGS OF ALUMINUM, CHROMIUM, GOLD.) (REFLECTION, DIFFRACTION GRATI
NGS, COLLIMATORS.)   -
269 584   0052   MAIN PROPELLANT TANK PRESSURIZATION SYSTEM STUDY AND
TEST PROGRAM. VOLUME III. DESIGN HANDBOOK.

269 584   0052   DESIGN INFORMATION ON LIQUID PROPELLANT TANK
PRESSURIZATION SYSTEMS IS PRESENTED. THE AREAS COVERED ARE
PRESSURIZATION GAS REQUIREMENTS, INCLUDING HAND CALCULATION PROCEDURES
AND NOMOGRAPHS TANKAGE, INCLUDING MATERIAL PROPERTIES AND VOLUME AND
WALL AREA CURVES AND COMPONENTS, INCLUDING STORED HE SYSTEM WEIGHT
CURVES AND A SIMPLE BUT ACCURATE HEAT EXCHANGER DESIGN METHOD.
(AUTHOR) (TISTW/DLW) OTS PRICE $11.50 RADIATION LAB., U. OF MICHIGAN,
ANN ARBOR. STUDIES IN RADAR CROSS SECTIONS - XLVI. THE CONVERGENCE OF
LOW FREQUENCY EXPANSIONS IN SCALAR SCATTERING BY SPHEROIDS, BY
T. B. A. SENIOR. 31 AUG 61, 143P. INCL. ILLUS. TABLES, 7
REFS. (SCIENTIFIC REPT. NO. 4 REPT. NO. 3648-4-T) 9CONTRACT AF
19(604)6655) 9AFCRL-787)UNCLASSIFIED REPORT   DESCRIPTORS (*RADAR ECHO
AREAS, RADAR RE FLECTIONS, ELECTROMAGNETIC WAVE REFLECTIONS,
*ELLIPSOIDS, BODIES OF REVOLUTION, SCATTERING, DIFFRACTION, THEORY,
PARTIAL DIFFERENTIAL EQUATIONS, WAVE ANALYSIS, MATHEMATICAL PRE
DICTION, MATHEMATICAL ANALYSIS.) FOR THE SCALAR PROBLEM OF THE
DIFFRACTION OF A PLANE WAVE BY A SPHEROID THE EXACT SOLUTION IS KNOWN,
AND AT LOW FREQUENCIES THE EXPRESSION FOR THE FAR FIELD AMPLITUDE CAN
BE EXPANDED IN A SERIES OF INCREASING POSITIVE POWERS OF KA, WHERE K IS
THE WAVE NUMBER AND 2A IS THE INTERFOCAL DISTANCE. THIS IS THE
RAYLEIGH SERIES, AND IS CONVERGENT FOR SUFFICIENTLY SMALL VALUES OF
KA. TO DETERMINE THE RANGE OF FREQUENCIES FOR WHICH THIS EXPANSION IS
APPLICABLE AN ESSENTIAL FACTOR IS THE RADIUS OF CONVERGENCE, AND THE
DISCUSSION IS DEVOTED ENTIRELY TO THE CALCULATION OF THIS QUANTITY.
ATTENTION IS CONCENTRATED ON THE CASE IN WHICH THE PLANE WAVE IS
INCIDENT NOSE-ON, AND THE RADIUS OF CONVERGENCE IS OBTAINED AS A
FUNCTION OF THE LENGTH-TO-WIDTH RATIO FOR PROLATE AND OBLATE SPHEROIDS,
HARD AS WELL AS SOFT. FOR OTHER ANGLES OF INCIDENCE IT CAN BE SHOWN
THAT THE RADIUS IS NOT GREATER THAN THIS, AND IN MOST INSTANCES IT
WOULD APPEAR TO BE THE SAME.   9AUTHOR)

269 584   0051   (LIQUID ROCKET PROPELLANTS, *PROPELLANT TANKS, PRESSUR
E, CONFIGURATION, GEOMETRY, VOLUME, DESIGN, MILITARY REQUIRE-MENTS, MATH
EMATICAL ANALYSIS, HANDBOOKS.) (GAS GENERATING SYSTEMS, ROCKET FUELS, RO
CKET OXIDIZERS, VAPORIZATION, COMBUSTION.) (GASES, LIQUEFIED GASES, OXYG
EN, HYDROGEN, HYDRAZINES, METHYL HYDRAZINES, NITROGEN COM-POUNDS, TETROX
IDES, STORAGE.) (PROPELLANT TANK LINERS, MATERIALS, METALS, PHYSICAL P
ROPERTIES.) HEAT EXCHANGERS.   -
269 587   0053   SPACE RADIATOR ANALYSIS AND DESIGN. PART I,

269 587   0053   THE THERMAL ANALYSIS OF COMPONENT ELEMENTS OF SPACE
RADIATORS IS DESCRIBED. ELEMENTS INCLUDE RECTANGULAR AND CIRCULAR
PLATES OF UNIFORM THICKNESS, TRIANGULAR AND TRAPEZOIDAL FINS, AND
CONSTANT TEMPERATURE-GRADIENT FINS. A COMPLETE CONDENSER AND A
RADIATOR ARE ANALYZED AND ILLUSTRATIVE EXAMPLES GIVEN. THE THERMAL
ANALYSES PRODUCED RELATIONSHIPS BETWEEN THE PHYSICAL PROPERTIES AND
DIMENSIONS, ELEMENT AND ENVIRONMENTAL TEMPERATURES, AND RATES OF HEAT
TRANSFER. THESE ARE SHOWN GRAPHICALLY FOR ALL TYPES OF ELEMENTS. THE
OPTIMUM PROPORTIONS OF SPACE RADIATOR ELEMENTS HAVING THE GREATEST
RATIO OF HEAT RADIATION RATE PER POUND OF WEIGHT ARE ALSO INDICATED
GRAPHICALLY, AND PROCEDURES FOR THEIR CALCULATION ARE SHOWN. THE
DISCUSSIONS ON CONDENSERS AND RADIATORS INCLUDE DIMENSIONAL-THERMAL
RELATIONSHIPS AND WEIGHT-OPTIMIZING PROCEDURES FOR COMPLETE UNITS.

269 587   0052   (SPACESHIPS, SATELLITE VEHICLES, *RADIATORS, RADIANT HE
ATING PANELS, METAL PLATES, REFRIGERANT CONDENSERS, HEAT, TEMPERA-TURE C
ONTROL, HEAT TRANSFER, HEAT EXCHANGERS, CONVECTION, *THERMAL RADIATION,
DESIGN, CONFIGURATION, EFFECTIVENESS, MATHEMATICAL ANALYSIS, MILITARY RE
QUIREMENTS.)   —
269 589   0054   THE EFFECTS OF FEEDBACK AND GROUP TASK DIFFICULTY ON
INDIVIDUAL AND GROUP PERFORMANCE,

269 589   0054   THIS EXPERIMENT WAS CONCERNED WITH THE EFFECTS OF
FEEDBACK AND GROUP TASK DIFFICULTY ON THE PERFORMANCE OF INDIVIDUALS
WORKING IN SEVEN MEN TEAMS AND ON GROUP PERFORMANCE. THE RESULTS
INDICATE THAT THE PERFORMANCE OF INDIVIDUALS IMPROVE WHEN THEY WORK ON
A GROUP TASK, AND THAT THE MOST PRONOUNCED IMPROVEMENT OCCURS FOR A
DIFFICULT GROUP TASK WHEN INFORMATION ABOUT THE PERFORMANCE OF ALL TEAM
MEMBERS AS WELL AS OF THE TEAM AS A WHOLE IS MADE AVAILABLE. WHEN
INFORMATION ABOUT TEAM PERFORMANCE ALONE (CONFOUNDED FEEDBACK) IS GIVEN
ONLY SLIGHT IMPROVEMENT OCCURS. GROUP TASK DIFFICULTY LED TO
INCREMENTS IN INDIVIDUAL AND GROUP PERFORMANCE, ALTHOUGH THESE
INCREMENTS WERE RELATIVELY WEAKER THAN THOSE DUE TO FEEDBACK. IT WAS
INCIDENTALLY FOUND THAT INDIVIDUALS PERFORMING AT HIGH RATES WERE MORE
SENSITIVE TO FEEDBACK THAN TO GROUP TASK DIFFICULTY, WHILE THE OPPOSITE
WAS FOUND FOR GROUP MEMBERS PERFORMING AT LOW RATES.

269 589   0053   (*GROUP DYNAMICS, *JOB ANALYSIS, EFFECTIVENESS, FEEDBAC
K, LABOR.) SOCIOMETRICS, MATHEMATICAL ANALYSIS.   —
269 593   0055   NOL RING TEST EVALUATION OF THREE HIGH MODULUS GLASS
FIBERS,

269 593   0055   DATA ON THE STRENGTH PROPERTIES OF GLASS ROVING
REINFORCED PLASTICS IS DISCUSSED. EXPERIMENTAL GLASS FORMULATIONS WERE
USED IN THE PREPARATION OF TEST SPECIMENS WHICH WERE EVALUATED BY THE
SERIES OF NOL RING TEST METHODS. RESULTS SHOW THAT MUCH PROGRESS WAS
MADE IN THE DEVELOPMENT OF HIGHER MODULUS FIBERS FOR REINFORCED
PLASTICS. A TENSILE MODULUS OF 13.4 X 10 TO THE 6TH POWER PSI WAS
OBTAINED WITH YM-31-A IN A RING. CALCULATED TO A 100$ GLASS BASIS, THE
MODULUS OF THE GLASS WAS 17.6 X 10 TO THE 6TH POWER PSI, WHICH COMPARES
WELL WITH 17 X 10 TO THE 6TH POWER PSI REPORTED IN LITERATURE.

269 593   0054   (*PLASTICS, REINFORCING MATER-IALS, *GLASS TEXTILES, *C
ERAMIC FIBERS, FIBERS, FILAMENT WOUND CONSTRUCTION, RINGS, MECHANICAL PR
OPERTIES, TENSILE PROPERTIES, SHEAR STRESSES, TESTS.) (EPOXY RESINS, RE
SINS, MANUFACTURING METHODS, TEST METHODS.)   —
269 595   0056   THERMODYNAMICS OF INTERSTITIAL SOLID SOLUTIONS.

269 595   0056   THE THERMODYNAMICS OF INTERSTITIAL SOLID SOLUTIONS
IN TERMS OF THE CONTRIBUTIONS OF POSITIONAL AND VIBRATIONAL ENTROPY AND
ZERO POINT ENTHALPY WAS CONSIDERED IN DETAIL FOR IDEAL AND RESTRICTED
INTERSTITIAL SOLUTIONS. THE RESULTS WERE APPLIED TO CALCULATION OF
PHASE EQUILIBRIA IN INTERSTITIAL IRON-CARBON ALLOYS AT ONE ATMOSPHERE
AND HIGH PRESSURE. COMPARISON WITH OBSERVATIONS ON KINETICS OF THE
BAINITE REACTION AND HIGH PRESSURE EQUILIBRIA ACTION YIELDS GOOD
AGREEMENT. A METHOD EVOLVED FOR COMPUTING THE ENTROPY OF SOLUTIONS AND
INTERMETALLIC COMPOUNDS FROM 0 K TO THE MELTING POINT WAS APPLIED TO 35

NACL TYPE COMPOUNDS (INCLUDING HIGH MELTING CARBIDES, OXIDES AND
NITRIDES). THESE COMPUTATIONS COMPARE FAVORABLY WITH EXPERIMENTAL
DATA. A STUDY OF THE INTERSTITIAL SOLUTIONS IN THE TITANIUM—OXYGEN
SYSTEM INDICATES THAT THE HIGH TEMPERATURE STABILITY OF THE
H.C.P. SOLUTION IS DUE TO THE ENTHALPY OF FORMATION.

269 595   0055   (*THERMODYNAMICS, CHEMICAL EQUILIBRIUM, *PHASE TRANSITI
ONS, *EUTECTICS, SOLID STATE PHYSICS.) (METALS, IRON, CARBON, *INTERMET
ALLIC COMPOUNDS, ALLOYS.) (CRYSTAL STRUCTURE, METALLURGY, CRYSTALS, LAT
TICES.) (MELTING, TEMPERATURE, TABLES.)   - _____
269 596   0057   STRESS REDISTRIBUTION IN NOTCHED SPECIMENS UNDER
CYCLIC STRESS.

269 596   0057   MOST MATERIALS EXHIBIT A CHANGE IN STRESS—STRAIN
RELATIONSHIP WHEN SUBJECT TO FATIGUE STRESSES. THE EFFECT OF THIS
CHANGE ON THE STRESS DISTRIBUTION ACROSS THE THROAT OF NOTCHED PLATE
SPECIMENS OF MILD STEEL IS EXAMINED. THE STRAIN DISTRIBUTION ACROSS
THE SPECIMENS WAS DETERMINED UNDER DYNAMIC CONDITIONS FOR VARIOUS
NUMBERS OF CYCLES. TESTS OF UNNOTCHED SPECIMENS WERE USED TO OBTAIN
THE CYCLIC STRESS—STRAIN PROPERTIES FOR CORRESPONDING NUMBERS OF
CYCLES, AND FROM THESE DATA THE STRESS DISTRIBUTION IN THE NOTCHED
SPECIMENS WAS DETERMINED. GOOD AGREEMENT WAS OBTAINED BETWEEN THE
INTEGRAL OF THE STRESS DISTRIBUTION CURVE AND THE TOTAL LOAD ON THE
SPECIMEN. TESTS IN WHICH THE STRAIN AMPLITUDE AT THE NOTCH ROOT WAS
HELD CONSTANT REVEALED A DECREASING MAXIMUM STRESS WITH FATIGUE
CYCLES. IN OTHER TESTS IN WHICH THE LOAD AMPLITUDE WAS CONSTANT, THE
MAXIMUM STRESS AMPLITUDE DECREASED WITH NUMBER OF FATIGUE CYCLES,
DESPITE AN INCREASING STRAIN AMPLITUDE. IN BOTH TYPES OF TEST, THE
STRESS CONCENTRATION FACTOR DECREASED WITH INCREASING AVERAGE—STRESS
AMPLITUDE, AND A FURTHER DECREASE OCCURS WITH INCREASING NUMBER OF
FATIGUE CYCLES.

269 596   0056   (*STEEL, *FATIGUE (MECHANICS), STRESSES, DEFLECTION, TE
ST METHODS, METAL PLATES, CYLINDRICAL BODIES, ELASTICITY, PLASTICITY, HA
RDENING, DEFORMATION.) (TEST EQUIPMENT, STRAIN GAGES, LOADING, TESTS, T
HEORY.)   - _____
269 600   0058   THE STUDY FOR AUTOMATIC ABSTRACTING C107—1U12.

269 600   0058   TECHNIQUES FOR THE AUTOMATIC ABSTRACTING OF TEXTUAL
INFORMATION ARE PRESENTED. ONE APPROACH IS THE STUDY OF ATTRIBUTES OF
CONTROLLED HUMANPRODUCED ABSTRACTS TO DEDUCE FROM SUCH STUDY A
MECHANIZABLE TECHNIQUE FOR CREATING SIMILAR PRODUCTS. A PROCEDURE
MAKING EFFICIENT USE OF MECHANIZED DATA HANDLING WAS IMPLEMENTED TO
COLLECT, ORGANIZE, AND PRESENT LANGUAGE DATA FOR ANALYSIS. THE RESULTS
OF SUCH ANALYSIS WERE FED BACK TO THE MACHINE AS THE BASIS FOR A NEW
CYCLE OF EXPERIMENTS. A SECOND APPROACH IS BASED ON A SENTENCE
CLASSIFICATION SCHEME FOR CONTENT REPRESENTATION AS A MEASURE FOR
DETERMINING THE RELATIVE SIGNIFICANCE OF DIFFERENT PORTIONS OF AN
ARTICLE. EXTRACT—TYPE ABSTRACTS WERE PRODUCED MANUALLY FOR 100
ARTICLES EACH ARTICLE WAS EXTRACTED SEPARATELY BY THREE INDIVIDUALS.
EACH SENTENCE WAS CODED TO REFLECT THE NUMBER OF PERSONS SELECTING IT
FOR EXTRACTION. FREQUENCY COUNTS OF THE MATERIAL IN EACH CATEGORY WERE
MADE. THE FULL TEXT OF THE SAMPLE LIBRARY, TOGETHER WITH THE ABOVE
INFORMATION, WAS RECORDED ON PUNCHED CARDS AND A COMPUTER PROGRAM WAS
WRITTEN AND RUN. THE SECOND MAJOR APPROACH CONSISTS OF THEORETICAL
INVESTIGATIONS TO CODE, AND ARTICLES.

269 600   0057   (AUTOMATIC, *ABSTRACTING, *DATA PROCESSING SYSTEMS, COM
PUTERS, CODING.)   -
269 688   0059   BIOLOGICALLY ACTIVE STEROID GLYCOSIDES FROM
HOLOTHURIANS.

269 688   0059   PUBLISHED REPORTS SHOW THAT THE CRUDE HOLOTHURIN
DERIVED FROM THE CUVIERIAN TUBULES OF THE BAHAMIAN SEA-CUCUMBER
ACTINOPYGA AGASSIZI HAS A WIDE VARIETY OF BIOLOGICAL PROPERTIES,
INCLUDING AN IRREVERSIBLE BLOCKING ACTION ON NERVE, INTERFERENCE IN THE
SEQUENTIAL DEVELOPMENTAL PROCESSES OF THE SEA-URCHIN EGG, AND
INHIBITION OF CERTAIN TUMORS IN MICE.   THE PUBLISHED PAPER APPENDED TO
THIS REPORT SUMMARIZES THE EFFECTS OF HOLOTHURIN ON VARIOUS BIOLOGICAL
SYSTEMS AND ALSO INCLUDES A BIBLIOGRAPHY OF THE SEVERAL PAPERS
PUBLISHED ON THIS SUBJECT.

269 688   0058   (*ECHINODERMS, *STEROIDS, *GLY-COSIDES, TOXICITY, *FISH
ES, SHARKS, CHEMOTHER-APEUTIC AGENTS, NERVES, INHIBITION.)   (*MARINE BIO
LOGY, BIOCHEMICAL TESTS, BIOLOGY, ECOLOGY, CHEMICAL PROPERTIES.)   -
269 689   0060   NEUTRON AND X-RAY DIFFRACTION STUDIES ON THE
STRUCTURE OF WC AND A COMPARISON OF IT WITH EARLIER ELECTRON
DIFFRACTION DATA.

269 689   0060   A NEUTRON DIFFRACTION STUDY OF WC REVEALS THAT WC
CRYSTALLIZES IN A HEXAGONAL FORM WITH ONE W ATOM IN 000 AND ONE C ATOM
IN 1/3 2/3 1/2.   NEUTRON DIFFRACTION STUDY IN CONTRADISTINCTION TO THE
ELECTRON AND X-RAY DIFFRACTION STUDIES CONCLUSIVELY ESTABLISHES THAT WC
DOES NOT CRYSTALLIZE IN THE NIAS TYPE STRUCTURE.

269 689   0059   (*TUNGSTEN COMPOUNDS, *CARBIDES, PHASE STUDIES, *CRYSTA
L STRUCTURE, METALLIC CRYSTALS, CRYSTALS, NEUTRON DIFFRACTION ANALY-SIS,
 X-RAY DIFFRACTION ANALYSIS, ELECTRON DIF-FRACTION ANALYSIS.)   METALLIC
COMPOUNDS.   -
269 692   0062   EXPLORATION OF THE BIOCHEMICAL BASIS FOR DIFFERENT
ELECTROPHYSIOLOGICAL STATES OF THE NERVOUS SYSTEM.

269 692   0062   NO ABSTRACT AVAILABLE

269 692   0061   (*BRAIN, *BIOCHEMICAL TESTS, *ELECTRICAL PROPERTIES, CE
LLS (BIOLOGY).) (*NERVOUS SYSTEM, TISSUES (BIOLOGY), *METAB-OLISM, ENZYM
ES, OXIDATION, METABOLIC PROD-UCTS, ADENOSINE PHOSPHATES, BRAIN TUMOR, N
UCLEOTIDES.)   INSTRUMENTATION, *MEDICAL RESEARCH.   -
269 739   0063   DEVELOPMENT OF LOW TEMPERATURE BRAZING OF TUNGSTEN
FOR HIGH TEMPERATURE SERVICE.

269 739   0063   REMELT SEPARATION TEMPERATURE WAS DETERMINED FOR
SPECIMENS BRAZED WITH PT-2.15B ALLOY, WITH AND WITHOUT W POWDER
ADDITIONS.   JOINT THICKNESS STUDY IS CONTINUING.   ADDITIONS OF TI OR ZR
TO JOINTS MADE WITH PT-3.0B ALLOY WERE NOT EFFECTIVE IN RAISING REMELT
TEMPERATURE.

269 739   0062   (REFRACTORY MATERIALS, *TUNGSTEN, *BRAZING, SILVER SOLD
ERS, LOW TEMPERATURE RESEARCH.)   (SOLDERING ALLOYS, PLATINUM ALLOYS, BOR
ON ALLOYS, ADDITIVES, POWDER ALLOYS, POWDER METALS, TUNGSTEN.)   (WELDED
JOINTS, METAL JOINTS, DIFFUSION, MELTING, HEAT TREATMENT, CHEMICAL REACT
IONS, THICKNESS.)   (TUNGSTEN COMPOUNDS, BORIDES, ADDITIVES, TITANIUM, ZI
RCONIUM, THIN FILMS, FOILS, TESTS.)   -

269 693   0064   CONCEPTS AND OBJECTIVES FOR A THREAT
EVALUATION/ACTION SELECTION SIMULATION RESEARCH FACILITY,

269 693   0064   THE IMPORTANCE OF TIMELY THREAT EVALUATION AND
ACTION SELECTION (TEAS) IN THE POST-1970 ERA IS PARAMOUNT IN THE FACE
OF (1) ADVANCES IN WEAPONS TECHNOLOGY LEADING TO TREMENDOUS INCREASES
IN LETHALITY AND SPEED OF DELIVERY, AND (2) THE PROBABLE AND HIGHLY
UNDESIRABLE CONSEQUENCES OF SELECTING A WRONG ACTION. PRELIMINARY
CONSIDERATIONS ARE PRESENTED WHICH SHOULD AFFECT THE DESIGN OF A
FACILITY TO BE USED FOR THE SIMULATION OF A POST-1970 TEAS ACTIVITY.
 EMPHASIZED ARE THE ENVIRONMENTAL AND CONCEPTUAL 9 6939N6

269 693   0063   (*MILITARY OPERATIONS, *AIR FORCE OPERATIONS, *DISPLAY
SYSTEMS, DATA PROCESSING SYSTEMS, COMMAND SYSTEMS, CONTROL SYSTEMS, WARF
ARE, SIMULATION, *TEST FACILITIES, OPERA-TIONS RESEARCH.)   —
269 697   0065   PROJECT LIGHTNING.

269 697   0065   APPLICATION OF THE PROCESSOR SYSTEM HAS BEEN
MODIFIED SOMEWHAT IN THAT THE KILOMEGACYCLE COMPUTER IS TO BE
CONSIDERED PART OF A LARGER DATAPROCESSING SYSTEM AND IS NOT INTENDED
PRIMARILY FOR ARITHMETIC PROBLEMS. THE QUESTION OF CONVENTIONAL VERSUS
UNCONVENTIONAL DESIGN IS DISCUSSED. ANOTHER BOUNDARY, THAT OF THE
EFFECT OF TUNNEL-DIODE COMPONENTS, HAS BEEN MODIFIED IN THAT THE LOW
FAN POWER OF TUNNEL DIODE CIRCUITS CONFLICTS WITH THE DESIRE FOR
COMPLEX AND SOPHISTICATED LOGIC. VARIOUS ASPECTS OF INPUTOUTPUT ARE
ALSO DISCUSSED, AND THE CONTROL SCHEME IS PRESENTED. FINALLY, THE
CHARACTERISTICS OF THREE PROPOSED COMPUTERS (FROM LARGE TO SMALL) ARE
SET FORTH AS A FAMILY OF DESIGNS.

269 697   0064   (*DATA PROCESSING SYSTEMS, *COMPUTERS.) (ELECTRONIC CI
RCUITS, COMPUTER LOGIC, MEMORY DEVICES, DIODES.) RESEARCH PROGRAM ADMIN
ISTRATION.   —
269 698   0066   PROJECT LIGHTNING.

269 698   0066   NO ABSTRACT AVAILABLE

269 698   0065   (*DATA PROCESSING SYSTEMS, *COM-PUTERS.) (*ELECTRONIC
CIRCUITS, COMPUTER LOGIC, MEMORY DEVICES.) (TRANSISTORS, TRIODES, CADMI
UM COMPOUNDS, SULFIDES, THIN FILMS, SEMI-CONDUCTOR FILMS, CRYSTALS.) (D
IODES, GERMA-NIUM, GALLIUM COMPOUNDS, ARSENIDES.) (TRANS-MISSION LINES,
 ELECTRICAL CONNECTORS.) OSCILLOSCOPES.   —
269 699   0067   A DUAL DECOMPOSITION PRINCIPLE,

269 699   0067   A DECOMPOSITION PRINCIPLE FOR LINEAR PROGRAMMING IS
PRESENTED. THE TECHNIQUE MAY BE VIEWED AS A DUAL OF THE DANTZIG —
WOLFE DECOMPOSITION PRINCIPLE FOR LINEAR PROGRAMS. THE PROGRAM MATRIX
IN WHAT WE MAY CALL THE BASIC PROBLEM IS CONSIDERED AS HAVING MANY (AN
INFINITE NUMBER OF) COLUMNS. ONE VISUALIZES A BASIC PROBLEM, IN PRIMAL
FORM, WHERE, THE SET OF PERMISSIBLE COLUMNS IS NOT FINITE, AS IN THE
USUAL PRIMAL FORM, BUT IS A GIVEN CONVEX POLYHEDRON. THE BASIC PROBLEM
IS SOLVED BY THE MODIFIED SIMPLEX METHOD, BUT AT EACH ITERATION THE
COLUMN TO ENTER THE CURRENT BASIS EMERGES AS THE SOLUTION TO AN
AUXILIARY LINEAR PROGRAM AND IS, IN FACT, AN EXTREME POINT OF THE GIVEN
CONVEX POLYHEDRON.

269 699   0066   (*SCHEDULING, *LINEAR PROGRAM-MING, DIGITAL COMPUTERS,
MANAGEMENT ENGINEERING,   PRODUCTION, ECONOMICS, RELIABILITY.)   OPERA-TIO
NS RESEARCH.   -
269 709   0068   DEVELOPMENT OF ELECTRONIC VERNEUIL FURNACE.

269 709   0068   RESEARCH IS CONCERNED WITH THE DEVELOPMENT OF
TECHNIQUES FOR THE GROWTH OF REFRACTORY SINGLE CRYSTALS BY A MODIFIED
VERNEUIL TECHNIQUE.   AN INVESTIGATION WAS MADE OF METHODS OF ATTAINING
HIGH TEMPERATURES BY EXTRACTING ENERGY FROM ELECTRICAL PLASMA TORCHES
RATHER THAN BY GASEOUS COMBUSTION WHICH IS THE ESTABLISHED TECHNIQUE.
THE THEORETICAL CONSIDERATIONS AND PRACTICAL EFFORTS RELATING TO THE
DEVELOPMENT OF A FUNCTIONING PLASMA TORCH ARE DESCRIBED.

269 709   0067   (LABORATORY FURNACES, *PLASMA JETS, PLASMA PHYSICS, *HI
GH TEMPERATURE RE-SEARCH, SINGLE CRYSTALS, *REFRACTORY MATERIALS, ELECTR
IC DISCHARGES, GAS DISCHARGES, RADIO-FREQUENCY POWER, RADIOFREQUENCY GEN
ERATORS, ALTERNATING CURRENT, THEORY, DESIGN.)   (CRYS-TAL STRUCTURE, CRY
STALS, GROWTH.)   -
269 713   0069   THE EFFECT OF SURFACE TEMPERATURE VARIATIONS ON THE
POLAR NIGHT JET,

269 713   0069   THE POSSIBILITY OF DIFFERENTIAL HEATING IN THE OZONE
LAYER DUE TO DIFFERENCES IN GROUND AND LOWER TROPOSPHERE TEMPERATURES
AS A MECHANISM FOR PRODUCING THE OBSERVED STATIONARY PERTURBATIONS OF
THE POLAR NIGHT JET WAS EXAMINED.   IT IS FOUND THAT THIS MECHANISM IS
NOT LIKELY TO BE THE CAUSE OF THE DISTURBANCES.

269 713   0068   (STRATOSPHERE, *JET STREAMS, OZONE, HEATING.)   (ATMOSPH
ERE MODELS, PERTUR-BATION THEORY, PARTIAL DIFFERENTIAL EQUATIONS, INTEGR
AL TRANSFORMS.)   -
269 714   0070   THE SUCCESSION PROBLEM AND THE TRANSITION TO
COMMUNISM,

269 714   0070   NO ABSTRACT AVAILABLE

269 714   0069   (*USSR, *COMMUNISM, *POLITICAL SCIENCE.)   -
269 721   0071   DEVELOPMENT OF REFRACTORY CERAMICS THAT CAN BE
PROCESSED AT TEMPERATURES CONSIDERABLY LOWER THAN THEIR MAXIMUM USE
TEMPERATURE.

269 721   0071   AN EVALUATION OF THE STRENGTH, ELECTRICAL
PROPERTIES, AND REFRACTORINESS OF BODIES FABRICATED CONTAINING 94$
AL2O3 UTILIZING DIFFERENT FORMS OF THE MGO ADDITIVE IS PRESENTED.
ALUMINA BODIES IN THE ALUMINA-CHROMIA-TITANIA, ALUMINA-CHROMIA, AND
ALUMINA-CHROMIA-SILICA SYSTEMS WERE FABRICATED.   INTRODUCTION OF THE
DEVITRIFIABLE GLASS, LEAD ALUMINOSILICATE, INTO AN ALUMINA MATRIX WAS
INVESTIGATED.   THE EFFECT OF LONGER SOAKING PERIOD UPON DENSITY WAS
ALSO STUDIED.

269 721   0070   (*RADOMES, MATERIALS, PROCESSING, TEMPERATURE.)   (*REFR
ACTORY MATERIALS, *CERAMIC MATERIALS, ALUMINUM COMPOUNDS, MAGNESIUM COM-
POUNDS, CHROMIUM COMPOUNDS, TITANIUM COM-POUNDS, SILICON COMPOUNDS, OXID
ES, MIXTURES, GLASS, SILICATES, LEAD COMPOUNDS, CRYSTAL STRUCTURE.)   (AL
UMINUM COMPOUNDS, OXIDES, OXYCHLORIDES.)   (PREPARATION, PROCESSING, SINT
ERING.)   (PHYSICAL PROPERTIES, DENSITY, POROSITY, ELECTRICAL PROPERTIES,
 DIELECTRIC PROPERTIES.)   -

269 725   0072   ORBITS WITH FIXED LOW THRUST,

269 725   0072   THE METHOD OF KRYLOV-BOGOLIUBOFF IS USED TO ANALYZE
ORBITS WITH AN ADDITIONAL LOW THRUST IN A FIXED DIRECTION IN THE ORBIT
PLANE.   ALGEBRAIC FORMULAS FOR ORBITAL ELEMENTS ARE OBTAINED.   IT IS
SHOWN THAT EVENTUALLY THE ORBITAL ECCENTRICITY INCREASES TO 1 WITH THE
ORBIT APPROACHING A STRAIGHT LINE THROUGH THE CENTER OF THE EARTH.
HOWEVER, IN A PRACTICAL CASE, IT IS LIKELY THAT COLLISION WOULD OCCUR
BEFORE ESCAPE.

269 725   0071   (SATELLITE VEHICLES, SATELLITE VEHICLE TRAJECTORIES, *O
RBITAL FLIGHT PATHS, THRUST, MATHEMATICAL ANALYSIS.)   −
269 039   0073   STUDIES PERTAINING TO BAMBI. SPACE-TIME   SAMPLING
AND FILTERING.

269 039   0073   METHODS WERE DEVELOPED WHICH ARE APPLICABLE TO THE
PROBLEM OF MANIPULATING VISUAL DATA AVAILABLE TO A SATELLITE SO AS TO
ENHANCE THE DETECTION OF A GIVEN TARGET.   STUDY WAS ORIENTED TOWARD THE
DETECTION OF A MISSILE IN THE POWERED PHASE.   CONSIDERING THE INTENSITY
DISTRIBUTION ON AN OPTICAL IMAGE PLANE AS THE INPUT, FOUR DIFFERENT
TYPES OF SPATIAL FILTERS ARE DEVELOPED.   THE STATISTICAL DESCRIPTION OF
THE BACKGROUND, WHICH MUST BE KNOWN PRIOR TO APPLYING THE   THEORY,
VARIES FROM THE AUTOCORRELATION FUNCTION FOR A LINEAR FILTER TO A
COMPLETE STATISTICAL DESCRIPTION FOR THE GENERAL STATISTICAL AND
DECISION THEORY FILTERS.

269 039   0072   (*ANTIAIRCRAFT DEFENSE SYSTEMS, *SATELLITE VEHICLES, OP
TICAL SYSTEMS, INFRARED OPTICAL SYSTEMS, *OPTICAL FILTERS, *INFRARED FI
LTERS, OPTICAL IMAGES, INFRARED IMAGES, SAMPLING, SIGNAL-TO-NOISE RATIO,
 STATISTICAL FUNCTIONS.) (GUIDED MISSILES, SURFACE TO SURFACE, LAUNCHIN
G, DETECTION, DETECTORS.)   −
269 316   0074   INSTRUMENTATION FOR USE IN THE STUDY OF
EXTRATERRESTRIAL PARTICLES.

269 316   0074   RESEARCH WAS DIRECTED TOWARD THE DETERMINATION OF
THE PROPERTIES OF EXTRA-TERRESTRIAL PARTICLES ENTERING THE EARTH'S
ATMOSPHERE.   INSTRUMENTATION AND TECHNIQUES WERE DEVELOPED WITH WHICH
TO MEASURE THE INFLUX RATE, SIZE, MASS, AND VELOCITY OF
MICROMETEORITES.   ADDITIONAL INSTRUMENTATION WAS DEVELOPED TO STUDY AND
CALIBRATE MICROMETEORITE DETECTORS IN THE LABORATORY AND TO INVESTIGATE
NEW DETECTION TECHNIQUES.   INSTRUMENTS WERE INSTALLED IN BALLOONS,
ROCKETS, AND OTHER SPACE VEHICLES AND THE DATA OBTAINED FROM THE
FLIGHTS OF THESE VEHICLES WAS ANALYZED IN THE LABORATORY.

269 316   0073   (*METEORITES, PARTICLES, *IN-STRUMENTATION, MEASUREMENT
.) (METEORITES, SIMULATION OF DETECTION.) (CALIBRATION OF METEORITES,
PARTICLES, DETECTORS.) (VACUUM SYSTEMS FOR ACCELERATION OF PARTICLES.)
(HYPERVELOCITY GUNS FOR ACCELERATION OF PAR-TICLES.)   (INSTRUMENTATION F
OR ANALYSIS OF *INTERSTELLAR MATTER.)   −
269 383   0075   DURATION OF THE SLOW NO DECOMPOSITION REGIME BEHIND
SHOCK WAVES AROUND 3000 DEGREE K AND ITS RELATION TO THE RATE
COEFFICIENT OF THE EXCHANGE PATH NO   O YIELDS N   O2.

269 383   0075   AN ANALYSIS OF THE CHEMICAL MECHANISMS GOVERNING THE
FIRST AND SLOW NO DECOMPOSITION REGIME BEHIND SHOCK WAVES AROUND 3000 K
IS PROVIDED. THE DURATION OF THIS REGIME IS ESSENTIALLY INVERSELY
PROPORTIONAL TO THE RATE COEFFICIENT K6 WHICH GOVERNS THE EXCHANGE PATH
NO O YIELDS N O2 AND IS RATHER INSENSITIVE TO CHANGES OF ADDITIONAL
RATE COEFFICIENTS ENTERING THE EXPRESSION. COMPARISON OF CALCULATED
VALUES FOR THE TIME DURATION BASED UPON A VALUE K6 EQUALS 2.03 X 10 TO
THE 10TH POWER 1/T2 X EXP (-38100/RT) CC/MOLE/SEC WITH EXPERIMENTAL
SHOCK TUBE RESULTS SHOWS AGREEMENT WITHIN 50$ FOR TEMPERATURES BETWEEN
2250 AND 3450 K. THIS RESULT IMPLIES THE VALIDITY OF THE
PRE-EXPONENTIAL TEMPERATURE DEPENDENCY FACTOR 1/T2 AS DERIVED FROM
COLLISION THEORY FOR THE HIGH TEMPERATURE EXTRAPOLATION OF THE VALUE OF
K6 DETERMINED BY PREVIOUS INVESTIGATIONS AROUND 500 K.

269 383   0074   (SHOCK TUBES, SHOCK WAVES, DECOMPOSITION, REACTION KINE
TICS, EXCHANGE REACTIONS, *NITROGEN COMPOUNDS, *OXIDES AND OXYGEN, HIGH
TEMPERATURE RESEARCH, DENSITY, KINETIC THEORY, MATHEMATICAL ANALYSIS.)

269 413   0076   STABILITY OF CUSHIONED LUNAR LANDING.

269 413   0076   STABILITY AGAINST OVERTURNING IS ANALYZED FOR A
LANDING VEHICLE HAVING A CRUSHABLE PAD FIXED TO ITS BASE AS THE LANDING
DEVICE. THE PAD MATERIAL IS ASSUMED IDEALLY RIGID-PLASTIC AND ITS
UNCRUSHED SHAPE IS THAT OF A PRISM WITH ANNULAR CROSS SECTION. THE
ANALYSIS IS CONFINED TO PLANAR MOTION OF LANDINGS MADE ON A SLOPING
SURFACE. BOUNDARIES DEFINING THE REGIONS OF INITIAL TRANSLATORY
VELOCITIES THAT RESULT IN STABLE LANDINGS ARE GIVEN FOR A CLASS OF
EXAMPLES OF PRACTICAL INTEREST IN WHICH THE VEHICLE IS HORIZONTAL AND
NONROTATING AT INITIAL CONTACT. SEVERAL SETS OF VEHICLE AND SURFACE
PARAMETERS ARE STUDIED, CENTERED ABOUT A VEHICLE WITH SATISFACTORY
CHARACTERISTICS FOR A SOFT LUNAR LANDING ON A 15-DEGREE SLOPE. IT IS
FOUND THAT DUE TO AN INITIAL ANGLE BETWEEN THE PAD AND LANDING SURFACE,
A STRIP OF INSTABILITY TENDS TO APPEAR CENTERED ABOUT A CRITICAL
INITIAL VELOCITY NORMAL TO THE SURFACE. THIS SITUATION IS AGGRAVATED
BY INCREASING EITHER THE SLOPE, THE VEHICLE MASS RADIUS OF GYRATION,
THE CENTER-OF-GRAVITY HEIGHT, OR THE PAD-CRUSHING STRESS. DROP TESTS
AND THE NUMERICAL RESULTS OF THIS STUDY INDICATE THAT, EVEN FOR
REALISTIC CRUSHABLE MATERIALS, AN ANALYSIS BASED ON RIGID-PLASTIC
MATERIAL BEHAVIOR GIVES A GOOD INDICATION OF STABILITY
CHARACTERISTICS. (AUTHOR) AD-269 4139N6

269 413   0075   (*LUNAR PROBES, MOON, LANDING, STABILITY, DYNAMICS, MAT
HEMATICAL ANALYSIS.) (SHOCK, ABSORPTION, IMPACT SHOCK, VIBRATION ISOLATO
RS, MATERIALS, DESIGN.)   -
269 513   0077   INVESTIGATION FOR THE DEVELOPMENT OF CERAMIC BODIES
FOR ELECTRON TUBES,

269 513   0077   EFFORTS TO PRODUCE A NONABSORBENT MICROCRYSTALLINE
QUARTZ BODY BY HIGH-TEMPERATURE FIRING OF CA-DOPED SIO2 THAT HAD BEEN
PRECALCINED TO DEVELOP THE QUARTZ PHASE FAILED. COMPOSITIONS WERE
FORMULATED IN WHICH CA2SIO4 WAS THE PRINCIPAL PHASE. MEANS OF DOPING
THE COMPOSITIONS TO PREVENT BODY DISINTEGRATION, CAUSED BY THE BETA TO
GAMMA INVERSION ON COOLING, WERE STUDIED. THE PRESENCE OF SUFFICIENT
MGO PREVENTED THE TEST DISCS FROM DUSTING AND SEEMED TO PRESERVE
BETA-CA2SIO4 TO ROOM TEMPERATURE. SIMILAR STABILIZATION WAS OBTAINED
BY THE INTRODUCTION OF APPROXIMATELY 1 WT-$ B2O3, OR BY THE FORMATION

OF A SOLID SOLUTION HAVING A MOLE RATIO OF 1 $CA3(PO4)2$15 $CA2SIO4$. THE
1 $BA2SIO4$15 $CA2SIO4$ COMPOSITION WAS NOT STABILIZED, BUT THE 1 $BA2SIO4$7
$CA2SIO4$ SAMPLE WAS VERY HARD AND DID NOT DISINTEGRATE UNTIL BOMBARDED
BY X RAYS. THE 1 $MG2SIO4$7 $CA2SIO4$ MIXTURE PRODUCED A BODY THAT DUSTED
ON COOLING AND GAVE DEFINITE X-RAY EVIDENCE THAT MERWINITE ($CA3MGSI2O8$)
FORMED.   EXPERIMENTS WERE MADE TO DETERMINE THE SUITABILITY OF $ALPO4$
AS A MAJOR PHASE IN A CERAMIC BODY.

269 513   0076   (*ELECTRON TUBES, *CERAMIC MA-TERIALS, ALKALINE EARTH C
OMPOUNDS, SILICATES, SYNTHESIS, QUARTZ CRYSTALS, PHASE TRANSITIONS, STAB
ILIZATION, THERMAL EXPANSION.) (SILICON COMPOUNDS, TETROXIDES, CALCIUM
COMPOUNDS, BARIUM COMPOUNDS, CHEMICAL IMPURITIES, MAGNESIUM COMPOUNDS,
BORON COMPOUNDS, OXIDES.) (ALUMINUM COMPOUNDS, PHOSPHATES.)   -
269 520   0078   INTEGRATION OF PERSONAL EQUIPMENT.

269 520   0078   THIS REPORT DESCRIBES THE VARIOUS EFFORTS, METHODS
OF APPROACH AND SOLUTIONS TO SOME PROBLEMS OF INTEGRATING ITEMS OF AIR
CREW PERSONAL EQUIPMENT. THE MAJOR PROBLEMS OF INTEGRATION IS THE
COMBINING OF THE VARIOUS INDIVIDUAL ITEMS, WHICH HAVE SPECIFIC
FUNCTIONS WITH EACH OTHER, WITHOUT COMPLICATING THESE COMBINATIONS
BEYOND THEIR EFFECTIVENESS LIMITS. PRACTICAL SOLUTIONS WERE ACHIEVED
IN SOME AREAS BUT ADDITIONAL WORK IS REQUIRED IN OTHERS.

269 520   0077   (*PNEUMATIC LIFE RAFTS, *PROTEC-TIVE CLOTHING, *SURVIVA
L, AVIATION PERSONNEL, EFFECTIVENESS, FEASIBILITY STUDIES, SEA RESCUE EQ
UIPMENT.) SURVIVAL KITS, CLOTHING, HELMETS, PRESSURE SUITS.   -
269 539   0079   STRONG INTERACTION WITH SLIP BOUNDARY CONDITIONS.

269 539   0079   A SOLUTION TO THE PROBLEM OF STRONG INTERACTION
BETWEEN THE SHOCK WAVE AND THE BOUNDARY LAYER HAS BEEN OBTAINED FOR THE
CASE WHERE VELOCITY SLIP AND TEMPERATURE JUMP BOUNDARY CONDITIONS ARE
CONSISTENT AT THE WALL. IT IS SHOWN THAT THE ADDITION OF SLIP BOUNDARY
CONDITIONS YIELDS A CORRECTION OF ORDER (BOUNDARY LAYER THICKNESS/X) TO
THE NO SLIP SOLUTION. ESTIMATES ARE MADE OF THE EFFECT OF SLIP ON
INDUCED PRESSURES AND SKIN FRICTION FOR THE CASE OF THE ADIABATIC
WALL. IN ADDITION, IT IS SHOWN THAT THE INCLUSION OF SLIP BOUNDARY
CONDITIONS DOES NOT CHANGE THE ENERGY TRANSFER TO THE WALL FROM THE NO
SLIP VALUES.

269 539   0078   (*AIRFOILS, AERODYNAMICS, *HYPERSONICS, SHOCK WAVES, *B
OUNDARY LAYER, INTERFERENCE, PRESSURE, DRAG, HEAT TRANSFER, MATHEMATICAL
 ANALYSIS.)   -
269 553   0080   MAIN PROPELLANT TANK PRESSURIZATION SYSTEM STUDY AND
TEST PROGRAM. VOLUME IV. COMPUTER PROGRAM.

269 553   0080   A COMPUTER PROGRAM WHICH CAN BE USED TO DETERMINE THE
PRESSURIZING GAS REPUIREMENTS FOR A MISSILE PROPELLANT TANK
PRESSURIZATION SYSTEM IS DESCRIBED. THE PROGRAM IS APPLICABLE TO BOTH
CRYOGENIC AND STORABLE PROPELLANTS WHEN PRESSURIZED WITH STORED GAS,
EVAPORATED PROPELLANT, AND MAIN TANK INJECTION METHODS OF
PRESSURIZATION. (AUTHOR)   AD-269 5539N6

269 553   0079   (GUIDED MISSILES, FUEL TANKS, *PROPELLANT TANKS, *HEAT
TRANSFER, AERODYNAMIC HEATING.) (THERMODYNAMICS, EQUATIONS, DIG-ITAL COM
PUTERS, *PROGRAMMING.) (PRESSURE TANKS, GASES, HEAT TRANSFER.)   -

269 556   0081   SPACE ENVIRONMENTAL EFFECTS ON GEARS AND BEARINGS.
AN ANNOTATED BIBLIOGRAPHY.

269 556   0081   AN ANNOTATED BIBLIOGRAPHY ON GEARS AND ·BEARINGS,
RESULTING FROM A GENERAL LITERATURE SEARCH AS AN AID TO THE
CONSIDERATION OF DESIGN FACTORS, TEMPERATURE, SPEED EFFECTS AND WEAR
PROBLEMS ON MATERIALS THAT COULD GIVE SATISFACTORY SERVICE IN
SPACECRAFT APPLICATIONS IS PRESENTED.

269 556   0080   (*BIBLIOGRAPHY, *SPACE ENVIRON-MENTAL CONDITIONS, MATER
IALS, SPACESHIPS, *BEARINGS, *GEARS, LUBRICATION.)   —
269 572   0082   INVESTIGATION OF MICROWAVE NON-LINEAR EFFECTS
UTILIZING FERROMAGNETIC MATERIALS.

269 572   0082   ELIMINATION OF VOLTAGE BREAKDOWN WITHIN THE HARMONIC
GENERATION CIRCUIT IS DISCUSSED WITH THE RESULTING EFFECTS UPON APPLIED
POWER NOTED. ALSO DESCRIBED IS A 70 GC POWER DIVIDER, A NEW DEVICE
USED AS A VARIABLE, HIGH-POWER ATTENUATOR IN DOUBLING EXPERIMENTS.
DATA RESULTING FROM 8 TO 4 MM DOUBLING IS PRESENTED AS A BASIS FOR
EXTENDING PRESENT METHODS TO KLYSTRON ·OPERATION. THE SIGNAL AND IDLER
RESONANCES, OF THE FERRITE AMPLIFIER ARE DESCRIBED AS MAGNETO-DYNAMIC
MODES. EXPERIMENTAL VERIFICATION OF THIS DESCRIPTION IS PRESENTED.
EXPRESSIONS ARE DERIVED WHICH RELATE AMPLIFIER NOISE FIGURE TO THE
INPUT VSWR WITH NO PUMP APPLIED. OPERATION OF THE AMPLIFIER AS A LOWER
SIDEBAND UPCONVERTER IS REPORTED. CONSTRUCTION OF A NEW AMPLIFIER
CONFIGURATION IS DESCRIBED.

269 572   0081   (*FERROMAGNETIC MATERIALS, FERRITES, YTTRIUM, IRON, *GA
RNET, SINGLE CRYSTALS, NONLINEAR SYSTEMS, MICROWAVE EQUIP-MENT, ELECTROM
AGNETIC PROPERTIES, MEASUREMENT.) (*MICROWAVE AMPLIFIERS, *PARAMETRIC AM
PLIFIERS, *FREQUENCY MULTIPLIERS, KLYSTRONS, RADIOFRE-QUENCY GENERATORS,
 EXTREMELY HIGH FREQUENCY, DESIGN, TESTS.)   —
269 573   0083   INVESTIGATIONS IN COMPUTER-AIDED DESIGN.

269 573   0083   THE APPLICATION OF THE CONCEPTS AND TECHNIQUES OF
MODERN DATA PROCESSING TO THE DESIGN OF MECHANICAL PARTS, AND THE
FURTHER DEVELOPMENT OF AUTOMATIC PROGRAMMING SYSTEMS FOR NUMERICALLY
CONTROLLED MACHINE TOOLS ARE STUDIED. TOPICS COVERED INCLUDE (1) A
DESCRIPTION OF INITIAL WORK ON A BOOTSTRAP COMPILER FOR PROGRAMMING
WITH ''PLEX'' STRUCTURES, INCLUDING THE HANDLING OF FREE STORAGE AND
SYMBOL TABLES (2) MODIFICATIONS TO THE NEW CALCULATING PROGRAM
(ARELEM) FOR THE APT SYSTEM (3) INITIAL EXPERIMENTS WITH GRAPHICAL
LANGUAGES (4) SOME PROPOSALS FOR IMPROVED COMPUTER DESIGN FOR
MANIPULATING PLEX STRUCTURES (5) SUMMARIES OF THESES ON GRAPHICAL
LANGUAGES, STRESS ANALYSIS AND SELECTION OF STANDARD PARTS AND (6)
MATHEMATICAL TECHNIQUES USEFUL IN DESIGN.

269 573   0082   (*DIGITAL COMPUTERS, *PROGRAM-MING, MATHEMATICAL LOGIC,
 MECHANICAL ENGINEER-ING, MACHINE TOOLS.) (MEMORY DEVICES, DESIGN, *DAT
A PROCESSING SYSTEMS, DATA STORAGE SYS-TEMS.) (STATISTICAL ANALYSIS, RE
LIABILITY, TOPOLOGY.) (MATHEMATICAL ANALYSIS, STRESSES, QUALITY CONTROL
.)   —

269 576   0084   STUDY OF THE EFFECTS OF BETA-RADIATION ON THE
INTERMEDIARY METABOLISM OF MAMMALIAN SKIN.

269 576   0084   NO ABSTRACT AVAILABLE

269 576   0083   (*RADIATION EFFECTS, *MAMMALS, LABORATORY ANIMALS, SODI
UM COMPOUNDS, PHOS-PHATES, SKIN, *METABOLISM.) BIOSYNTHESIS, TRACER STU
DIES.   -
269 608   0086   C-BAND, WIDEBAND SOLID STATE AMPLIFIER.

269 608   0086   RESEARCH IS CONCERNED WITH THE DEVELOPMENT OF A
STRAIGHT THROUGH LOW NOISE AMPLIFIER, ELECTRONICALLY TUNABLE FROM 4000
TO 6000 KMC. PERTINENT LITERATURE IS REVIEWED AND A THEORETICAL
FOUNDATION FOR SUBSEQUENT EXPERIMENTAL AND THEORETICAL WORK
ESTABLISHED. UPPER BOUNDS FOR PRACTICALLY REALIZABLE SIGNAL, IDLER,
AND PUMP BANDWIDTHS ARE DETERMINED. IT IS SHOWN THAT EVEN WITH AN
INFINITE NUMBER OF TUNED SECTIONS, THE BANDWIDTH OF EACH CIRCUIT IS
ULTIMATELY LIMITED BY THE ELECTRICAL CHARACTERISTICS AND PARASITIC
ELEMENTS OF THE VARACTOR DIODE. NOISE FIGURE LIMITATIONS WITH
PRESENTLY AVAILABLE DIODES ARE REVIEWED AND THE PROPER PUMP FREQUENCY
IS APPROXIMATELY DETERMINED.

269 608   0085   (*PARAMETRIC AMPLIFIERS, MICRO-WAVE AMPLIFIERS, C BAND,
 BROADBAND, SOLID STATE PHYSICS, DIODES, TUNING CIRCUITS, ELECTRONIC CIR
CUITS, THEORY, DESIGN, NOISE (RADAR), MEASUREMENT.) AMPLIFIERS.   -
269 632   0087   ELECTRICAL FIELD OF A MOVING DROPLET,

269 632   0087   THE THEORY OF THE ELECTROKINETIC DIFFUSION EFFECT OF
A DROPLET ARISING DURING MOTION OF ITS SURFACE IS GIVEN. FROM
CALCULATIONS MADE ON NOT EXCESSIVELY LARGE DROPLETS, THE FALL OF WHICH
IS CHARACTERIZED BY REYNOLDS NUMBERS LESS THAN UNITY, IT HAS BEEN
SHOWN THAT THIS EFFECT MAY LEAD TO ELECTRICAL FIELDS OF AN INTENSITY OF
100 V/CM. THE ABOVE EFFECT MUST BE TAKEN INTO ACCOUNT WHEN DEALING
WITH ORDINARY FRACTIONS OF ELECTRICALLY NEUTRAL OR CLOSE TO
ELECTRICALLY NEUTRAL DROPLETS. THE ELECTROKINETIC DIFFUSION EFFECT
PRESENTS A UNIQUE POSSIBILITY FOR THE STUDY OF EXTREMELY WEAK
ADSORPTION.

269 632   0086   (*DROPS, *ELECTRIC FIELDS, ELEC-TRICAL PROPERTIES, SURF
ACE PROPERTIES, BOUNDARY LAYER, DIFFUSION, REYNOLDS NUMBER, KINETIC THEO
RY, MATHEMATICAL ANALYSIS.) USSR.   -
269 639   0088   ENTHALPY AND HEAT CAPACITY OF MOLYBDENUM IN THE
1200-2500 DEGREE K TEMPERATURE RANGE,

269 639   0088   AN EXPERIMENTAL DETERMINATION OF THE ENTHALPY OF MO
IN THE 1164-2540 K RANGE WITH AN ERROR OF LESS THAN 1% WAS MADE.
MEASUREMENTS WERE BASED ON THE METHOD OF COALESCENCE IN A
HIGH-TEMPERATURE VACUUM DEVICE.

269 639   0087   (*MOLYBDENUM, HIGH TEMPERATURE RESEARCH, *ENTHALPY, *SP
ECIFIC HEAT, TEST METHODS, THERMOCHEMISTRY, THERMODYNAMICS.) USSR.   -
269 642   0089   NATURE (SELECTED ARTICLES).

269 642   0089   NO ABSTRACT AVAILABLE

269 642   0088   (*USSR, *SCIENTIFIC RESEARCH, *SPACE PROBES, *SPACE FLI
GHT.)   -

269 833   0090   STUDY LEADING TO THE DEVELOPMENT OF HIGH TEMPERATURE RESISTANT ADHESIVES.

269 833   0090   CHEMICAL MODIFICATIONS WERE ATTEMPTED ON POLY2,6-XYLENOLS AND CONDENSATION TRIAZINE TYPE POLYMERS WHICH HAD BEEN FOUND TO BE SUITABLE BASE MATERIAL FOR HIGH TEMPERATURE ADHESIVES FOR STAINLESS STEEL.   POLY-2,6XYLENOL WAS PREPARED.   HIGH MOLECULAR WEIGHT POLYXYLENOLS HAD GOOD ADHESION (2000-3000 PSI) AT ROOM TEMPERATURE, BUT LOST STRENGTH TO 10$ OF THE ORIGINAL AFTER HEATING AT 550 F. FOR 30 MIN.   THE LOW MOLECULAR WEIGHT MATERIAL MAY FLOW BETTER AND THEREFORE IMPART BETTER WETTING.   SEVERAL LOW MOLECULAR WEIGHT POLYXYLENOLS WERE PREPARED.   2-METHYL-6ALLYL-4-BROMOPHENOL WAS PREPARED AND A POLYMER WAS PREPARED FROM IT BY THE PRICE METHOD OF OXIDATIVE COUPHING.   NITRATION OF 2,4,6-TRIPHENYLS-TRIAZINE YIELDS 2,4-(DI-(M-NITROPHENYL)-6PHENYL-S-TRIAZINE.   REDUCTION OF THIS DERIVATIVE GIVES THE DIAMINO COMPOUND.   (AUTHOR) AD-269 8339N6

269 833   0089   (*ADHESIVES, HIGH TEMPERATURE RESEARCH, *HEAT RESISTANT POLYMERS, POLYMERS, PHENOLS, METHYL RADICALS, *TRIAZINES, SYN-THESIS, M OLECULAR WEIGHT, NITRATION, REDUCTION, POLYMERIZATION, ADHESION.) (AMINE S, BENZOYL RADICALS, GUANIDINES.) (ADHESIVES FOR STAIN-LESS STEEL.)   —
269 866   0091   NO TITLE AVAILABLE   .

269 866   0091   AD-269 8669N6   NO ABSTRACT AVAILABLE

269 866   0090   (*GYROSCOPES, INERTIAL NAVIGA-TION, SPHERES, BERYLLIUM.) (PHYSICS, *VACUUM SYSTEMS, PLASMA PHYSICS, ELECTRONS, MOLECULES, HELIU M.) (*SECONDARY EMISSION, GOLD, MOLYB-DENUM.) (*NUCLEAR RESONANCE, FLUOR ESCENCE, COPPER.) (*ELECTRONS, DIFFRACTION, CRYSTALS, GERMANIUM.) (*ANAL OG COMPUTERS, DIGITAL COMPUTERS, TRANSISTORS, COMPUTER LOGIC, PROGRAMMIN G.) (*PLASMA PHYSICS, *DELAY LINES.)   —
269 887   0092   HIGH TEMPERATURE THERMOELECTRIC GENERATOR.

269 887   0092   APPLIED RESEARCH AND DEVELOPMENT IS REPORTED ON A LABORATORY THERMOELECTRIC GENERATOR OPERATING AT A HOT JUNCTION TEMPERATURE OF 1200 C AND A COLD JUNCTION OF 500-700 C IN A VACUUM OF 1/100,000 MM HG.   APPARATUS NEEDED TO FABRICATE AND TEST CANDIDATE JUNCTION MATERIALS AND MODULES FOR USE WITH A NEW PROPRIETARY THERMOELECTRIC MATERIAL, MCC 50, ARE DESCRIBED.   TESTS TO BE CONDUCTED INCLUDE MECHANICAL STRENGTH, SUBLIMATION LOSS, ELECTRICAL PROPERTIES, THERMAL SHOCK AND RESISTANCE TO SOLID-STATE DIFFUSION.   PRELIMINARY EFFORTS TO PRODUCE MODULES OF MCC 50 IN COMBINATION WITH TANTALUM, TITANIUM, MOLYBDENUM AND TUNGSTEN BY HOT PRESS, RESISTANCE WELDING AND BRAZING WERE ONLY PARTIALLY SUCCESSFUL.   HOWEVER, A GRAPHITE-MCC 50-GRAPHITE MODULE WAS PRODUCED WHICH EXHIBITED JUNTIONS OF PROMISING MECHANICAL STRENGTH AND PRELIMINARY MEASUREMENTS OF ITS ELECTRICAL PROPERTIES WERE MADE.

269 887   0091   (*THERMOELECTRICITY, *GENERATORS, ELECTRIC POWER PRODUC TION, POWER SUPPLIES, DESIGN.) (THERMOCOUPLES OF TANTALUM, TITANIUM, MO LYBDENUM, TUNGSTEN, GRAPHITE, MANUFACTURING METHODS, TESTS.)   —

269 892   0093   DIRECT ENERGY CONVERSION LITERATURE ABSTRACTS.

269 892   0093   NO ABSTRACT AVAILABLE

269 892   0092   *BIBLIOGRAPHY, *ENERGY, CON-VERSION RATIO, *THERMOELECT
RICITY, THERMIONIC EMISSION, PHOTOEMISSION, PHOTOELECTRIC CELLS, *MAGNET
OHYDRODYNAMICS, ELECTROCHEMISTRY, FUEL CELLS, PRIMARY BATTERIES, STORAGE
BATTERIES, NUCLEAR ENERGY, SOLAR ENERGY, *POWER SUPPLIES, *SOLAR CELLS.

269 896   0094   EFFECT OF FINITE OXYGEN RECOMBINATION RATE ON THE
FLOW CONDITIONS IN HYPERSONIC NOZZLES,

269 896   0094   THE EFFECT IS ESTIMATED USING FOR AIR A SIMPLIFIED
MODEL GAS CONSISTING ONLY OF O, O2, AND N2. FOR THE RANGE OF SUPPLY
CONDITIONS CONSIDERED, THE GAS COMPOSITION FREEZES DURING EXPANSION
WITH THE OXYGEN ATOM CONCENTRATION DEPENDING STRONGLY ON SUPPLY
CONDITIONS, LESS SIGNIFICANTLY ON THE NOZZLE GEOMETRY. THE FRACTIONAL
DEPARTURE OF THE FLOW PARAMETERS FROM EQUILIBRIUM VALVES THEN DEPENDS
ON A GOOD APPROXIMATION ONLY ON THE OXYGEN ATOM CONCENTRATION.

269 896   0093   (OXYGEN, DISSOCIATION, RECOM-BINATION REACTIONS, HYPERS
ONIC NOZZLES, ROCKET MOTOR NOZZLES.) (*GAS FLOW, HYPERSONICS, AERODYNAM
ICS, TEMPERATURE, PRESSURE, VELOCITY, DENSITY, THERMODYNAMICS, ENTHALPY,
 MATHEMAT-ICAL ANALYSIS, TABLES.)   -
269 509   0095   CLASSICAL STATISTICAL THEORY OF DIELECTRIC FLUIDS,

269 509   0095   A FORMAL CLUSTER EXPANSION THEORY OF THE DIELECTRIC
CONSTANTS AND THE SUSCEPTIBILITIES OF NON-POLAR FLUIDS IS DEVELOPED AND
THE DEVIATION OF THE CLAUSIUS-MOSSOTTI EQUATION FROM EXPERIMENTS IS
DISCUSSED. MANY BODY POLARIZATION EFFECTS ARE CONSIDERED IN TERMS OF
DIAGRAMS. A CHAIN DIAGRAM APPROXIMATION GIVES THE SUSCEPTIBILITIES IN
TERMS OF THE FOURIER TRANSFORMS OF THE MAYER F-FUNCTION AND OF THE
EFFECTIVE DIPOLE INTERACTION TENSOR.

269 509   0094   (*STATISTICAL ANALYSIS, FLUIDS, GASES, *DIELECTRICS, PO
LARIZATION, ELECTRIC FIELDS, MOLECULES, DIPOLE MOMENTS, CHEMICAL BONDS.)
  (TENSOR ANALYSIS, FOURIER ANALYSIS, SERIES, INTEGRAL TRANSFORMS.)   -
269 623   0096   STRUCTURE FORMATION DURING SOLIDIFICATION OF TURBINE
BLADES CAST IN INVESTMENT PATTERNS,

269 623   0096   AN ATTEMPT WAS MADE TO STUDY THE PECULIARITIES OF
STRUCTURE FORMATION OF HEAT RESISTANT ALLOYS CAST UNDER CONDITIONS
CLOSE TO THOSE OF SOLIDIFICATION OF CAST TURBINE BLADES. WHEN SMELTING
ALLOYS SUCH AS NI-CR-C AND NI-CR-W-C, THE METALS W, MO, CO AND AL WERE
INTRODUCED IN A QUANTITY AMOUNTING TO 5% TI WAS ADDED IN A QUANTITY
AMOUNTING TO 2%. DURING SMELTING THE ALLOYS WERE HEATED TO 1450 OR
1700 DEGREES AND THEN POURED INTO HOT CERAMIC MOLDS HEATED TO 950
DEGREES. HEAT TREATMENT INVOLVED HEATING TO 1200 DEGREES. DEPENDING
ON SOLIDIFICATION CONDITIONS, THE TENDENCY TO MACROSTRUCTURAL CHANGES
DEPENDED GREATLY UPON THE ALLOY COMPOSITION. COMMON NICHROMES, AND
THOSE ALLOYED WITH MO, CO AND AL WERE EXTREMELY SENSITIVE TO OVERHEAT
NICHROME WITH AN ADDITION OF TI WAS ONLY SLIGHTLY SENSITIVE TO
SOLIDIFICATION RATE AND OVERHEAT.

269 623   0095   (*TURBINE BLADES, *HEAT RESISTANT ALLOYS, *NICKEL ALLOY
S, *CHROMIUM ALLOYS, IRON ALLOYS, TUNGSTEN ALLOYS, CASTING, HARDENING, P
ROCESSING, GRAINS (METALLURGY), LATTICES, MICROSTRUCTURE, PHASE STUDIES,
 MECHANICAL PROPERTIES.)   USSR.   -
269 630   0097   BREAKTHROUGH INTO SPACE,

269 630   0097   THE MATERIALS FOR THE BODY OF THE SPACESHIP SHOULD
PROTECT THE CREW FROM THE COSMIC VACUUM, WITHSTAND EROSION WHEN THE
SKIN IS BOMBARDED BY COSMIC DUST, AND WITHSTAND THE IMPACTS OF SMALL
METEORITES. A GROUP OF VERY REFRACTORY METALS WHICH MUST BE HEATED TO
3000 DEGREES AND HIGHER TO BE MELTED INCLUDE BE, NB, MO, TA, AND W. THE
PROPERTIES OF THESE METALS ARE DISCUSSED.

269 630   0096   (*GUIDED MISSILE NOSES, RE-ENTRY VEHICLES, RE-ENTRY AER
ODYNAMICS, *REFRACTORY MATERIALS, METALS, BERYLLIUM, NIOBIUM, MOLYB-DENU
M, TANTALUM, TUNGSTEN.)   (COOLING BY SUBLIMATION, THERMAL RADIATION AND
MAGNETIC FIELDS.) USSR.   -
269 638   0098   A POWERFUL AC-DC CONVERTER,

269 638   0098   THE DIFFICULTIES IN CREATING POWERFUL RECTIFIERS ARE
MAINLY DUE TO THE FACT THAT HIGH VOLTAGE ACCUMULATES IN THE DISCHARGE
GAPS WHICH UNDERGO PRELIMINARY IONIZATION   THIS DECREASES THEIR
ELECTRICAL AND RECTIFYING STRENGTH. IN THE EXAMINED CONVERTER THE AIR
GAPS (AT A PRESSURE OF 5-10 ABS ATM) ARE NOT IONIZED, SINCE WITH AIR
PRESSURE GREATER THAN 3 ABS ATM AND VOLTAGES LESS THAN DISCHARGE
VOLTAGES, THERE IS NO CORONA DISCHARGE. THE CONVERTER CONSISTS OF A
TRANSFORMER UNIT WHICH CREATES A MULTIPHASE CLOSED WINDING, A SWITCHING
DEVICE, AND RECTIFIERS.

269 638   0097   (*RECTIFIERS, SWITCHING CIRCUITS, PHASE TRANSFORMERS, E
LECTRODES,   USSR, DESIGN.)   -
269 644   0099   DETERMINATION OF THE PARAMETERS OF PARTICLE-SIZE
DISTRIBUTION,

269 644   0099   A MATHEMATICAL DEVICE IS DEVELOPED THAT YIELDS
NOMOGRAMS AND WHICH PERMITS US TO DETERMINE THE PARTICLE-SIZE
DISTRIBUTION OF SUSPENSIONS, FOGS, CLOUDS, ETC., FROM THREE
MEASUREMENTS OF THE RELATIVE INTENSITY OF LIGHT SCATTERED AT SMALL
ANGLES.

269 644   0098   (*STATISTICAL FUNCTIONS, DISTRIBUTION THEORY, STATISTIC
AL DISTRIBUTION.) (*PARTICLES, ANALYSIS, COLLOIDS, *CLOUDS, FOG.) (LIGH
T, SCATTERING, INTENSITY.) (NOMOGRAPHS, BESSEL FUNCTIONS.) USSR.   -
269 648   0100   OUR NEAREST COSMIC NEIGHBOR,

269 648   0100   THE MOON IS BEING STUDIED BY SCIENTISTS AND
ENGINEERS IN MANY SCIENTIFIC AND TECHNICAL FIELDS. A NEW PERIOD HAS
BEGUN IN THE BIOGRAPHY OF THE MOON. ON 14 SEPTEMBER 1959 THE SECOND
SOVIET COSMIC ROCKET REACHED ITS SURFACE. THE THIRD SOVIET COSMIC
ROCKET WAS LAUNCHED ON THE MORNING OF 4 OCTOBER 1959. USING A
PHOTOGRAPHIC TELEVISION APPARATUS IT PHOTOGRAPHED THE FAR SIDE OF THE
MOON AND TRANSMITTED THE IMAGE TO EARTH. FURTHER STEPS IN THE STUDY OF
THE MOON WILL BE THE DEVELOPMENT OF ARTIFICIAL LUNAR SATELLITES WHICH
WILL BE ABLE TO MAINTAIN RADIO AND TV CONTACT WITH THE EARTH   THE
MAKING OF A SOFT (NON-IMPACT) LANDING ON THE MOON'S SURFACE WITH

ROCKETS CARRYING VARIOUS SCIENTIFIC-RESEARCH APPARATUS   A ROUND-TRIP
ROCKET FLIGHT TO THE MOON AND FINALLY THE ORGANIZATION OF COSMIC SHIP
FLIGHTS TO THE MOON WITH RESEARCHERS ON BOARD.

269 648   0099   (MOON, LANDING, *LUNAR PROBES, USSR.)   -
269 649   0101   MEASUREMENT OF THE CORRELATION BETWEEN THE AMPLITUDE
AND FREQUENCY FLUCTUATIONS IN A REFLEX KLYSTRON,

269 649   0101   THE INTERFERENCE METHOD, USED TO MEASURE THE
AMPLITUDE AND FREQUENCY FLUCTUATIONS IN RADIOFREQUENCY OSCILLATORS, IS
USED TO STUDY THE CORRELATION DEPENDENCE BETWEEN THE AMPLITUDE AND
FREQUENCY FLUCTUATIONS IN A REFLEX KLYSTRON WITH A THREE-CENTIMETER
RANGE. EXPERIMENTAL GRAPHS ARE GIVEN FOR THE CORRELATION FUNCTION AT
SEVERAL DIFFERENT VOLTAGE VALUES ON THE REFLECTOR PLATE OF THE
KLYSTRON   THESE CORRESPOND TO THE GENERATION REFION WITH THE MAXIMUM
GENERATING POWER.

269 649   0100   (INTERFERENCE, AMPLITUDE MODULATION, *RADIOFREQUENCY OS
CILLATORS.) (*KLYSTRONS, POWER, VOLTAGE.) USSR.   -
269 667   0102   VARIANCE IN THE RATE OF SPEAKING BY PILOTS AND
CONTROLLERS IN COMMUNICATING TO U. S. AND FOREIGN LISTENERS,

269 667   0102   RECORDINGS OF. AIR TRAFFIC MESSAGES AT FOREIGN AND
DOMESTIC INTERNATIONAL AIRPORTS WERE EXAMINED TO DETERMINE IF PILOTS
AND CONTROLLERS ADJUST THEIR RATE OF SPEAKING IN TERMS OF PERCEIVED
LISTENER NEEDS. IT WAS FOUND THAT PILOTS AND CONTROLLERS USE A SLOWER
RATE WHEN SPEAKING IN ENGLISH TO LISTENERS WHOSE NATIVE LANGUAGE IS
NOT ENGLISH. IN GENERAL, THAT DATA SUPPORTS A CONCLUSION THAT PILOTS
AND CONTROLLERS ADJUST RATE OF SPEAKING TO MATCH PERCEIVED LISTENER
NEEDS.

269 667   0101   (*VOICE COMMUNICATION SYSTEMS, *SPEECH, *SPEECH TRANSM
ISSION, INTELLIGIBILITY, LANGUAGE, PILOTS, AIR TRAFFIC CONTROLLERS.)
-
269 701   0103   HIGH TEMPERATURE MICROWAVE TUBE DESIGN AND
PROCESSING.

269 701   0103   INVESTIGATIONS OF FACTORS WHICH WOULD .PERMIT
LONG-LIFE OPERATION OF MICROWAVE TUBES AT AN AMBIENT TEMPERATURE OF 350
C WERE CARRIED OUT. THE RK6249, A MAGNETRON IN HIGH USAGE AND
CONSIDERED OF TYPICAL CONSTRUCTION, WAS SELECTED AS THE TEST VEHICLE.
CERAMIC-TO-METAL SEAL ASSEMBLIES WERE DESIGNED TO REPLACE THE GLASS
BUSHINGS AND THE GLASS OUTPUT WINDOW. A WINDOW ASSEMBLY TO VIEW
CATHODE OPERATING TEMPERATURE WAS DESIGNED. WORK WAS CONDUCTED TO
PROVIDE FOR HIGH TEMPERATURE OXIDATION PROTECTION OF THE TUBE AT HIGH
AMBIENT TEMPERATURE IN AIR. THE TEST VEHICLES CONSTRUCTED WERE LIFE
TESTED AT 250 AND 400 C FOR SEVERAL HUNDRED HOURS. SCRAP ANALYSIS WAS
PERFORMED TO DETERMINE THE CAUSE OF TUBE FAILURE AND THE EFFECT OF HIGH
TEMPERATURE OPERATION ON TUBE COMPONENTS. MATERIALS AND PROCESSING
INVESTIGATIONS WERE CARRIED OUT DURING A PARALLEL EFFORT IN WHICH A
SUITABLE REPLACEMENT FOR COPPER WAS FOUND. THE REMOVAL OF CARBON
MONOXIDE FROM STAINLESS STEEL, KOVAR AND NICKEL WAS STUDIED.

269 701   0102   (*ELECTRON TUBES, *MICROWAVE EQUIPMENT, HIGH TEMPERATUR
E RESEARCH, DESIGN, MANUFACTURING METHODS.) (*MAGNETRONS, WAVE-GUIDE WI
NDOWS, REFRACTORY MATERIALS, PROCESS-ING, LIFE EXPECTANCY, TESTS.)   -

269 710   0104   COMPILATION OF UNPUBLISHED MATERIALS INFORMATION.

269 710   0104   MECHANICAL PROPERTY DATA, NOT HERETOFORE PUBLISHED,
ARE PRESENTED FOR 16 MATERIALS.   THESE DATA WERE OBTAINED FROM
MATERIALS PROGRAMS CONDUCTED DURING THE PAST 5 YRS.   THE FOLLOWING
MATERIALS ARE CONTAINED IN THE DATA COMPILATION   AL ALLOYS - 2014,
X2020, 7075, 7079 MG ALLOYS -HK31 TI ALLOYS - TI-4AL-4MN,
TI-5AL-2.5SN LOW ALLOY STEEL (90$ FE, OR GREATER) - SAE 4340 HIGH
ALLOY STEELS (LESS THAN 90$ FE) - W-545, AISI 431, AM-350, PH15,MO NI
ALLOYS - M-252, U-500 SANDWICH MATERIAL - KRAFT PAPER HONEYCOMB AND
BEARINGS - STAKING OF BEARINGS WITH PLASTICS.

269 710   0103   (*MATERIALS, *ALLOYS, *METALS, *SANDWICH CONSTRUCTION,
PAPER, HONEYCOMB CORES, PLASTICS, BEARINGS.) (MECHANICAL PROPERTIES, TE
NSILE PROPERTIES, DEFORMATION, STRESSES, SHEAR STRESSES, FATIGUE (MECHAN
ICS), FAILURE.   -
269 712   0105   AN ADIABATIC-ISOTHERMAL NOZZLE,

269 712   0105   A METHOD IS PRESENTED FOR THE NOZZLE CALCULATION FOR
A CHEMICALLY ACTIVE FLOW AT A CONSTANT STATIC TEMPERATURE.

269 712   0104   (*NOZZLES, DESIGN, *ADIABATIC GAS FLOW, MATHEMATICAL AN
ALYSIS, NUMERICAL METHODS AND PROCEDURES, EQUATIONS OF STATE, THERMODYNA
MICS.) (*ADIABATIC GAS FLOW, *COMPRESSIBLE FLOW, THERMAL EXPANSION, HEA
T OF REACTION, EQUATIONS OF STATE.) AERO-DYNAMICS, USSR.   -
269 727   0106   THE STABILITY OF THIN CONICAL FRUSTUMS SUBJECTED TO
AXIAL COMPRESSION AND INTERNAL OR EXTERNAL UNIFORM HYDROSTATIC
PRESSURE,

269 727   0106   CALCULATIONS ARE PRESENTED FOR THE PROBLEMS OF THE
STABILITY OF CONICAL SHELLS SUBJECTED TO   (1) COMBINED EXTERNAL UNIFORM
HYDROSTATIC PRESSURE AND AXIAL TENSION OR COMPRESSION, AND (2) COMBINED
INTERNAL UNIFORM HYDROSTATIC PRESSURE AND AXIAL COMPRESSION.   THE
INTERACTION CURVES FOR THE FIRST PROBLEM ARE FOUND TO DEPEND ON THE
RATIO OF THE END RADII OF THE CONE AND ARE BOUNDED BY THE LIMITING
CURVES FOR A CYLINDER AND FOR A COMPLETE CONE.   THE CHANGE OF SHAPE OF
THE CURVES WITH VARYING END RADIUS RATIO IS SMALL, HOWEVER.   FOR THE
SECOND PROBLEM THE CRITICAL AXIAL LOAD OF A PRESSURIZED CONE IS FOUND
TO BE GREATER THAN THE SUM OF THE CRITICAL AXIAL LOAD OF AN
UNPRESSURIZED CONE AND THE PRESSURE LOAD ON THE SMALL CROSS SECTION.
THE DIFFERENCE IS A FUNCTION OF THE INTERNAL PRESSURE AND OF THE CONE
GEOMETRY.

269 727   0105   (*STRUCTURAL SHELLS, CONICAL BODIES, STABILITY, HYDROST
ATIC PRESSURE.) (*LOAD DISTRIBUTION, DEFORMATION, BUCKLING, MECHANICAL P
ROPERTIES.) (EQUATIONS, EXPERI-MENTAL DATA, TABLES.)   -
269 729   0107   BERYLLIUM OXIDE. A LITERATURE SURVEY,

269 729   0107   THIS BIBLIOGRAPHY CONSISTING OF 283 ENTRIES COVERS
THE PERIOD FROM 1955 TO 1961. THE EMPHASIS IS ON BEO, ITS PHYSICAL,
CHEMICAL AND MECHANICAL PROPERTIES, PREPARATION AND FABRICATION
METHODS.   SOME INFORMATION IS GIVEN ON INTERMETALLIC COMPOUNDS OF BE
AND ITS ALLOYS. THE THIRD PART INCLUDES THE TOXICITY OF BE AND BEO AND
SAFETY MEASURES. IN PREPARATION OF THIS BIBLIOGRAPHY THE OPEN
LITERATURE SOURCES, PERTINENT INDEXES, ABSTRACTING JOURNALS,
UNCLASSIFIED REPORTS, AND   ASTIA HOLDINGS WERE CONSULTED.

269 729   0106   (*BERYLLIUM COMPOUNDS, OXIDES, CERAMIC MATERIALS, BERYL
LIUM, INTERMETALLIC COMPOUNDS, *BERYLLIUM ALLOYS, *REFRACTORY MATERIALS,
*BIBLIOGRAPHY.) TOXICITY, CRYSTAL STRUCTURE, PHYSICAL PROPERTIES, MECH
ANICAL PROPERTIES, MANUFACTURING METHODS.   —
269 732   0108   LOW RATE SENSING CAPABILITIES OF
SINGLE-DEGREECF-FREEDOM GYROS.

269 732   0108   A SURVEY OF THE LOW RATE SENSING CAPABILITIES OF
IN-PRODUCTION AND DEVELOPMENTAL MECHANICAL INSTRUMENTS IS DESCRIBED.
MECHANICAL RATE INSTRUMENTS INCLUDE PRIMARILY THE SINGLE
DEGREE-OFFREEDOM GYRO, SPRING RESTRAINED AND UNHEATED, AND ELECTRICALLY
RESTRAINED, HEATED AND UNHEATED. ALSO DISCUSSED ARE TWO CLASSES OF
VIBRATORY GYROS AND THE USE OF ANGULAR ACCELEROMETERS. TWO APPENDICES
ANALYZE THE EFFECT OF RATE SENSOR DEAD-BAND ON GAS CONSUMPTION, AND THE
USE OF A LOW RATE SENSOR TO DETECT SATELLITE YAW MOTION. IT IS
CONCLUDED THAT (1) THE ELECTRICALLY RESTRAINED, HEATED GYRO HAS THE
BEST OVER-ALL LOW RATE SENSING CAPABILITIES (2) THE SPRING RESTRAINED
GYRO HAS OVER-ALL PERFORMANCE QUALITIES WHICH SHOULD BE ADEQUATE FOR
MANY MISSIONS   (3) INTEGRATING THE OUTPUT OF AN ANGULAR ACCELEROMETER
APPEARS TO BE A VERY PROMISING PROSPECT AND (4) VIBRATORY GYROS ARE
IN THE EARLY STAGES OF DEVELOPMENT AND LITTLE IS KNOWN ABOUT THEIR
ACTUAL PERFORMANCE.

269 732   0107   (*GYROSCOPES, OPERATION.) (INSTRUMENTATION FOR STABILIZ
ATION OF *CONTROL SYSTEMS DURING SPACE FLIGHT.)   —
269 733   0109   SYNTHETIC MICA CRYSTAL GROWTH PROGRAM.

269 733   0109   VARIOUS CRYSTAL GROWING TECHNIQUES WERE INVESTIGATED
AS POSSIBLE MEANS OF PRODUCING LARGE SIZE SINGLE CRYSTALS OF SYNTHETIC
MICA (FLUORPHLOGOPITE TYPE) ON A COMMERCIALLY FEASIBLE BASIS. METHODS
INCLUDED CRYSTAL PULLING, ZONE MELTING, AND GROWTH FROM SOLUTION.
MOST FAVORABLE RESULTS WERE OBTAINED FROM A PROGRESSIVE INTERNAL
RESISTANCE MELTING USING ZONE MELTING PRINCIPLES, HOWEVER, NO METHOD
WAS FOUND FOR DELAMINATION OF THE CRYSTAL BOOKS. CRYSTAL PULLING
TECHNIQUES WERE UNSATISFACTORY. ZONE MELTING, USING INDUCTIVE
HEATING, PRODUCED CRYSTALS WITH GOOD ORIENTATION, BUT CRYSTAL SIZE WAS
SMALL. PROGRESSIVE MELTING, USING THE INTERNAL RESISTANCE METHOD OF
HEATING PRODUCED THE LARGEST CRYSTALS. RELATIVELY LARGE PERCENTAGES
OF SUCH CRYSTALS WERE OBTAINED WITHIN A MELT. THESE CRYSTALS WERE
LARGER THAN THOSE PRODUCED BY STANDARD PRODUCTION TECHNIQUES.
CRYSTALS OF SYNTHETIC MICA CAN BE GROWN FROM A SOLUTION USING GLASS AS
A SOLVENT.

269 733   0108   (*MICA, SINGLE CRYSTALS, GROWTH, MANUFACTURING METHODS,
*MICA CAPACITORS, *CAPACITORS, ZONE MELTING, CRYSTALLIZATION FROM SOLU
TIONS, GLASS, SOLVENT ACTION, HEAT TREAT-MENT, DIELECTRIC PROPERTIES.)
(CRYSTALS, THICKNESS, ULTRASONICS, SHOCK TUBES.)   —
269 735   0110   PRODUCTION FUNCTIONS WITH CONSTANT ELASTICITIES OF
SUBSTITUTION,

269 735   0110   THE CLASS OF PRODUCTION FUNCTIONS FOR WHICH
ELASTICITIES OF SUBSTITUTION ARE ALL CONSTANT REGARDLESS OF FACTOR
PRICES IS DISCUSSED. LET F(X1,X2) BE A PRODUCTION FUNCTION WHERE X1
AND X2 RESPECTIVELY REPRESENT THE AMOUNTS OF FACTORS 1 AND 2 EMPLOYED.
PRODUCTION IS ASSUMED TO BE SUBJECT TO CONSTANT RETURNS TO SCALE AND TO
DIMINISHING MARGINAL RATES OF SUBSTITUTION.

269 735   0109   (*PRODUCTION, *ECONOMICS, *FACTOR ANALYSIS, FUNCTIONS, PARTIAL DIFFERENTIAL EQUATIONS, ELASTICITY, SUBSTITUTES, COSTS, SCHEDULI NG, WAGES.)   -
269 738   0111   FAILURE MECHANISMS IN SILICON SEMICONDUCTORS.

269 738   0111   THIS REPORT INCLUDES STACKING FAULTS IN EPITAXIAL SILICON, BY H. J. QUEISSER, R. H. FINCH AND J. WASHBURN. 1961, (IN COOPERATION WITH LAWRENCE RADIATION LAB., U. OF CALIFORNIA, BERKELEY) DIFFUSION STUDIES ON SMALL ANGLE GRAIN BOUNDARIES IN SI WERE PERFORMED WITH THE DOPANTS GA, IN, AND AL TO INVESTIGATE THE INFLUENCE OF DISLOCATIONS ON THE BEHAVIOR OF DIFFUSED SI DEVICES. A MATHEMATICAL TREATMENT OF DIFFUSION ALONG ISOLATED DISLOCATIONS IS BEING EXPLORED. THE ELECTRICAL BEHAVIOR OF DEVICES WITH A SMALL ANGLE BOUNDARY WAS STUDIED. TWIN BOUNDARIES WERE INVESTIGATED AN ADVERSE EFFECT UPON DIODE REVERSE CHARACTERISTICS WAS FOUND ONLY FOR INCOHERENT TWIN BOUNDARIES. DEFECTS IN EPITAXIAL LAYERS WERE STUDIED EXTENSIVELY. SLICES OF LESS THAN 1 MICRON THICKNESS WERE FABRICATED THE TRANSPARENCY OF THESE SLICES ALLOWS DIRECT OBSERVATION OF DEFECTS WITH OPTICAL AND ELECTRON TRANSMISSION MICROSCOPY. STACKING FAULTS WERE DETECTED FOR THE FIRST TIME IN SI.

269 738   0110   (*SILICON, *SEMICONDUCTORS, DIODES, SINGLE CRYSTALS, C RYSTALS, CRYSTAL STRUCTURE, GROWTH, PREPARATION, DIFFUSION, CHEMICAL IMP URITIES, GALLIUM, INDIUM, ALUMINUM, FAILURE (MECHANICS), ELECTRICAL PRO PERTIES.) (MICROSCOPY, ELECTRON MICROSCOPES.)   -
269 741   0112   RADIATION FROM SHOCK-HEATED AIR. PART I. EQUILIBRIUM RADIATION,

269 741   0112   A COMPUTATIONAL PROCEDURE GIVING EQUILIBRIUM RADIATIVE HEAT TRANSFER RATES TO THE SURFACE OF A SHOCK ENGULFED VEHICLE IS PRESENTED. THE LOCAL TRANSFER RATES ARE OBTAINED IN TERMS OF THE LOCAL TEMPERATURE AND DENSITY AT THE OUTER EDGE OF THE BOUNDARY LAYER AND AN EFFECTIVE THERMAL LAYER. THE COMPUTED RADIATIVE TRANSFER RATES AROUND A TYPICAL ENTRY VEHICLE ARE PRESENTED. A COMPUTATIONAL PROCEDURE FOR THE NON-EQUILIBRIUM RADIATION IS PRESENTED IN PART II.

269 741   0111   (RE-ENTRY VEHICLES, SHOCK TUBES, *SHOCK WAVES, BOUNDARY LAYER, RE-ENTRY AERO-DYNAMICS, AERODYNAMIC HEATING, *THERMAL RADIATION , *HEAT TRANSFER, NUMERICAL ANALYSIS, TEMPERATURE, DENSITY, MATHEMATICAL PREDICTION.)   -
269 757   0113   LIQUID-GAS INTERFACE IN ZERO-G.

269 757   0113   IN THE INVESTIGATION OF THE BEHAVIOR OF A LIQUID-GAS MIXTURE IN A ZERO-G FIELD, AN EXPERIMENT UNIT WAS INSTALLED IN AN ATLAS REENTRY NOSECONE TEST VEHICLE. THE EXPERIMENT UNIT HOUSES A MOVIE CAMERA, PLACED SO AS TO OBSERVE AND RECORD THE INTERACTION OF GAS AND WATER CONTAINED IN A PLASTIC CUBE DURING THE 25-MINUTE NEAR-ZERO-G CONDITIONS PRESENT ON AN ICBM FLIGHT. TEMPERATURE AND PRESSURE CHANGES ARE ALSO RECORDED.

269 757   0112   (*LIQUIDS, FLUIDS, SURFACES WITH *GASES, DYNAMICS, GRAV ITY, ACCELERATION, WEIGHTLESSNESS, TEMPERATURE, PRESSURE, THEORY, TEST EQUIPMENT, TEST METHODS.)   -

269 762   0114   GRAPHS FOR PREDICTING THE IDEAL HIGH-SPEED RESISTANCE OF PLANING CATAMARANS,

269 762   0114   GRAPHS ARE PRESENTED BY MEANS OF WHICH THE HIGHSPEED RESISTANCE AND TRIM OF CATAMARAN PLANING HULLS OF A WIDE RANGE OF SIZES AND PROPORTIONS CAN BE DETERMINED. GRAPHS WHICH GIVE GUIDANCE IN SELECTING PARAMETERS WHICH WILL RESULT IN OPTIMUM PLANING PERFORMANCE ARE ALSO PRESENTED. VALUES FOR THE GRAPHS WERE OBTAINED FROM EQUATIONS FOR THE LIFT, CENTER OF PRESSURE, AND RESISTANCE OF PRISMATIC PLANING BOTTOMS WHICH WERE PREVIOUSLY DEVELOPED BY THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AND THE DAVID TAYLOR MODEL BASIN.

269 762   0113   (*CATAMARANS, *TESTS, DESIGN, HYDRODYNAMICS, BOUNDARY L AYER, TURBULENCE, *RESISTANCE, PHYSICAL PROPERTIES.) (*MATHEMAT-ICAL PRE DICTION, PROBABILITY, SAMPLING.)   -
269 763   0115   DEVELOPMENT AND PRODUCTION OF IMPROVED MOLYBDENUM SHEET BY POWDER METALLURGY TECHNIQUES.

269 763   0115   MO-TI AND MO-TI-C SHEETS ROLLED FROM SLABS SINTERED AT 2150 C WERE EVALUATED FOR COMPOSITION, RECRYSTALLIZATION TEMPERATURE, TENSILE PROPERTIES AT ROOM-TEMPERATURE AND 1200 C, 1200 C STRESS-RUPTURE PROPERTIES AND DUCTILE-BRITTLE TRANSITION TEMPERATURE. THE RESULTS WERE EXAMINED ALONG WITH RESULTS FROM PREVIOUS SHEET EVALUATIONS. THE DEPENDENCY OF SHEET PROPERTIES ON VARIATIONS IN ALLOY FORM AND CONCENTRATION AND SINTERING CONDITIONS WAS DETERMINED. THE SINTERING TEMPERATURE OF THE SLABS HAD THE GREATEST EFFECT ON SHEET PROPERTIES. THE TEST RESULTS VERIFIED THAT HIGH-TEMPERATURE PROPERTIES OF POWDER-METALLURGY SHEET PRODUCED FROM A MIXTURE OF MO WITH 0.5$ TI AND 0.1$ C SINTERED AT 2150 C ARE SUPERIOR TO THOSE OF THE COMPOSITIONAL COUNTERPART SINTERED AT 1800 C AND TO THOSE OF COMMERCIAL ARC-CAST MO-0.5TI-C SHEET.

269 763   0114   (*SHEETS, *MOLYBDENUM, *MOLYB-DENUM ALLOYS, TITANIUM AL LOYS, CARBON ALLOYS, PRODUCTION, ROLLING MILLS.)   (PHYSICAL PROPER-TIES , POWDER METALLURGY, CONTROLLED ATMOS-PHERES, SINTERING, ADDITIVES, TEMP ERATURE, TENSILE PROPERTIES, STRESSES, RUPTURE, BRITTLE MATERIALS, TRANS ITION TEMPERATURE, PHASE TRANSITIONS, HEAT OF FUSION, CRYSTAL STRUC-TURE , DENSITY, GRAINS (METALLURGY).) (HEAT RESISTANT ALLOYS, PROCESSING, SI NTERING VS MELTING, ELECTRIC ARCS, CASTING.)   -
269 764   0116   INFLUENCE OF ENVIRONMENTAL ALTERATIONS ON THE PERIPHERAL TRANSPORT AND METABOLISM OF THYROID HORMONE.

269 764   0116   STUDIES PERFORMED DURING THE COMPLETED TENURE OF THIS CONTRACT HAVE BEEN PRINCIPALLY DIRECTED TOWARD THE FOLLOWING OBJECTIVES IDENTIFICATION, PURIFICATION AND CHARACTERIZATION OF THE THYROXINE-BINDING PROTEINS OF THE PLASMA AND ELUCIDATION OF THEIR PHYSIOLOGICAL ROLE AND ABERRATIONS IN DISEASE STATES INVESTIGATION OF THE INTRACELLULAR MECHANISM FOR THE DEGRADATION OF THE THYROID HORMONES AND OF THE RELATIONSHIP BETWEEN HORMONAL DEGRADATION AND ACTION INVESTIGATION OF THE MECHANISM OF THYROID HORMONE BIOSYNTHESIS AND ITS REGULATION BY INTERMEDIARY METABOLISM OF THE THYROID. SPECIFIC FINDINGS IN THESE STUDIES HAVE BEEN DESCRIBED.

269 764   0115   (*THYROID HORMONES, *BIOSYNTHE-SIS, *METABOLISM, *THYRO XINE, DETECTION, PURIFICATION, BLOOD CIRCULATION, BLOOD PROTEINS, DETERI ORATION.) IODINE.   -

269 765   0117   EXPERIMENTS ON ROTATIONAL IMPACT,

269 765   0117   THE RESULTS OF AN EXPERIMENTAL INVESTIGATION TO
DETERMINE THE PRESSURES PRODUCED ON THE BOTTOM OF A SLAMMING SHIP WHEN
IMPACT WITH THE SMOOTH WATER SURFACE RESULTS FROM SIMPLE ROTATION IN
THE PLANE OF SYMMETRY ARE PRESENTED. THE EFFECT OF FORWARD SPEED OF
ADVANCE IS NOT INCLUDED. GRAPHS ARE INCLUDED WHICH SHOW PRESSURE
DEPENDENCE ON TIME AND ON SHAPE FOR A PARTICULAR TRANSVERSE SECTION. A
COMPARISON OF EXPERIMENTAL AND THEORETICAL AVERAGE PRESSURES FOR THIS
STATION SHOWS GOOD AGREEMENT IN MAGNITUDES FOR THE THEORETICAL
COMPUTATIONS AVAILABLE. IT IS NECESSARY TO CONSIDER ONLY THOSE
PRESSURES WHICH OCCUR A SHORT TIME AFTER THE KEEL CONTACTS THE WATER
SURFACE. THUS THE PROPER APPLICATION OF THE THEORY REQUIRES THAT THE
IMMERSION BE SMALL, BUT GREATER THAN ZERO. WITH THIS RESTRICTION AN
EXAMINATION OF MAXIMUM PRESSURES OVER THE FORWARD 22.5 PERCENT OF THE
SHIP'S LENGTH SHOWS THAT THE REGION EXPERIENCING THE HIGHEST PRESSURES
IS LOCATED APPROXIMATELY AT 9 PERCENT OF THE SHIP'S LENGTH AFT OF THE
FORWARD PERPENDICULAR.

269 765   0116   (*MODEL TESTS, IMPACT SHOCK, PRESSURE, SHIPS, *SHIP HUL
LS, WATER, SURFACE PROPERTIES, ROTATION, STABILITY (LONGITUDINAL).) (TES
T EQUIPMENT, EXPERIMENTAL DATA, TABLES, PHOTOGRAPHIC ANALYSIS.)   -
269 770   0118   THE DESIGN OF FUNDAMENTAL MODE MILITARY QUARTZ
RESONATORS FOR THE HC-18/U HOLDER 3 TO 12 MC.

269 770   0118   GENERAL DESIGN AND PRODUCTION DATA ARE PRESENTED FOR
FUNDAMENTAL MODE RESONATORS IN THE 3 TO 12 MC RANGE WHICH ARE TO BE
MOUNTED IN THE HC-18/U TYPE HOLDER. TWO PLATE CONFIGURATIONS WERE
INVESTIGATED PLANE-PARALLEL, AND PLANO-CONVEX. SATISFACTORY RESULTS
WERE OBTAINED WITH PLANEPARALLEL PLATES AT FREQUENCIES DOWN TO 9 MC,
AND WITH PLANO-CONVEX PLATES DOWN TO 3.5 MC. BELOW 3.5 MC, THE RESULTS
WITH PLANO-CONVEX PLATES WERE MARGINAL.

269 770   0117   (*QUARTZ RESONATORS, QUARTZ CRYSTALS, HIGH FREQUENCY, C
RYSTAL HOLDERS, CRYSTALS, PRODUCTION, DESIGN, TESTS.)   -
269 771   0119   LOW FREQUENCY RADIATION FROM AN ELECTRIC DIPOLE IN A
COLD ANISOTROPIC PLASMA,

269 771   0119   EXPRESSIONS FOR THE ELECTROMAGNETIC RADIATION FROM
AN ELECTRIC DIPOLE IN AN INFINITE COLD ANISOTROPIC PLASMA ARE PRESENTED
UNDER THE CONDITION THAT THE OPERATINGFREQUENCY IS MUCH LESS THAN THE
ION GYRO FREQUENCY. IT IS FOUND THAT THE MAJOR PORTION OF THE
RADIATION IS CONCENTRATED ALONG THE DIRECTION OF THE MAGNETOSTATIC
FIELD.

269 771   0118   (*LOW FREQUENCY, *ELECTROMAG-NETIC WAVES, ELECTRIC FIEL
DS, DIELECTRICS, DIPOLE MOMENTS.) (*PLASMA PHYSICS, ELECTRONS, IONS, HI
GH FREQUENCY, PLASMA OSCILLATIONS.)   -
269 772   0120   CAMOUFLAGE CLOTHING FOR RECONNAISSANCE   PERSONNEL.

269 772   0120   THE PROTOTYPE RECONNAISSANCE JACKETS M-2, WERE
TESTED BY THE 2D FORCE RECONNAISSANCE COMPANY DURING EXTENSIVE
AMPHIBIOUS OPERATIONS AT ST. THOMAS, VIRGIN ISLANDS DURING THE PERIOD
6 OCTOBER - 10 NOVEMBER 1961. RESULTS INDICATE THAT THE MODIFICATIONS
INCORPORATED INTO THE M-2 JACKET AS A RESULT OF THE INITIAL TESTS HAVE
NOW RENDERED THE JACKET A USEFUL ITEM THAT IS A SUBSTANTIAL
IMPROVEMENT OVER THE CAMOUFLAGE UTILITIES NOW IN USE.

269 772   0119   (*CAMOUFLAGE CLOTHING, NAVAL PERSONNEL, DESIGN, TESTS.)

269 007   0121   CARRIER CHARACTERISTICS IN COPPER-DOPED WO3 FROM
CONDUCTIVITY, HALL VOLTAGE, AND THERMAL E.M.F. STUDIES,

269 007   0121   SINGLE CRYSTALS OF CU0.076WO3, CU0.094WO3, AND
CU0.95WO3 DELTA WERE PREPARED BY THERMAL DECOMPOSITION OF CUWO4 AND
WO3.   POTENTIAL-PROBE RESISTIVITY MEASUREMENTS IN THE RANGE 120 TO 770
K INDICATE COMPLEX SEMICONDUCTING BEHAVIOR.   CU0.076WO3 AND CU0.094WO3,
WHICH ARE ORTHORHOMBIC, SHOW 3 LINEAR SEGMENTS IN THE LOG RHO VS. 1/T
DEPENDENCE, THE APPARENT ACTIVATION ENERGIES BEING 0.05 EV BELOW 170 K,
0.4 EV BETWEEN 170 AND 220 K, AND 0.45 EV ABOVE 500 K.   BETWEEN 220 AND
500 K, BEHAVIOR IS METALLIC.   CU0.95WO3 DELTA, WHICH IS TRICLINIC,
SHOWS NO METALLIC REGION BUT HAS 2 LINEAR SEGMENTS WITH ACTIVATION
ENERGY 0.10 EV BELOW 700 K AND 0.15 EV ABOVE.   MEASUREMENTS OF THE HALL
VOLTAGE AND OF THE THERMOELECTRIC POWER INDICATE THAT CARRIERS ARE
ELECTRONS.   AT 300 K, CARRIER DENSITIES ARE 4.9 X 10 TO THE 18TH POWER,
AND 0.90 X 10 TO THE 18TH POWER ELECTRONS/CC WITH MOBILITIES 5.9, 10,
AND 0.37 SQ CM/VOLT-SEC. FOR CU0.076WO3, CU0.094WO3, AND
CU0.95WO3 DELTA, RESPECTIVELY.   THERMAL EMF'S FALL IN THE RANGE -220 TO
-300 MICROVOLTS/DEGREE   C.

269 007   0120   (*SEMICONDUCTORS, *TUNGSTEN COM-POUNDS, OXIDES WITH COP
PER, CHEMICAL IMPURI-TIES, METALLIC COMPOUNDS, SINGLE CRYSTALS, PREPARAT
ION, ELECTROLYSIS AND TEMPERATURE, DECOMPOSITION, SYNTHESIS.) (CRYSTAL
STRUCTURE, LATTICES, RESISTANCE, HALL EFFECT, THERMO-ELECTRICITY, CONDUC
TIVITY, ELECTRIC POTENTIAL, MEASUREMENT.) (ELECTRON TRANSITIONS, EXCITA
-TION, FERROELECTRICITY, THEORY, DENSITY.)   -
269 015   0122   APPROXIMATE TRANSFER FUNCTIONS FOR
FLEXIBLEBOOSTER-AND AUTOPILOT ANALYSIS,

269 015   0122   INFORMATION IS PRESENTED TO ENABLE AN ENGINEER TO
UNDERSTAND AND ANALYZE THE PHENOMENA ASSOCIATED WITH A
FLEXIBLE-BOOSTER-AND-AUTOPILOT ANALYSIS.   SIMPLIFICATIONS AND
APPROXIMATIONS ARE GIVEN FOR ALL PHASES OF SYNTHESIS AND ANALYSIS, AND
THE LIMITATIONS OF THE SIMPLIFIED SOLUTIONS ARE DISCUSSED.   THE
DEVELOPMENT OF METHODS FOR   SYNTHESIS AND ANALYSIS OF FLEXIBLE BOOSTERS
IS PRESENTED IN SEVERAL STAGES--FROM SIMPLE LINEAR TECHNIQUES USEFUL
FOR PREDESIGN OR PRELIMINARY DESIGN ANALYSIS, UP TO THE COMPLEX FORMS
REQUIRING COMPUTER SOLUTIONS, WHICH MAY BE USED TO   VERIFY THE ADEQUACY
OF THE FINAL FLEXIBLE-BOOSTER-AND-AUTOPILOT CONFIGURATION.   THE METHODS
OF SYNTHESIS AND ANALYSIS ARE PRESENTED WITH 3 LIMITATIONS (1) A LINEAR
AIRFRAME IS ASSUMED   (2) THE AERODYNAMIC SURFACES (WINGS) ARE ASSUMED
TO BE SMALL AND RELATIVELY RIGID   AND (3) THE AERODYNAMICS ARE
REPRESENTED BY A SIMPLE QUASI-STEADY MODEL.   RESULTS INDICATE THAT
ACCURATE SOLUTIONS   FOR MOST NONWINGED FLEXIBLE BOOSTERS CAN BE
ACHIEVED BY SIMPLE ROOT-LOCUS TECHNIQUES INVOLVING LINEARIZED
EQUATIONS.

269 015   0121   (GUIDED MISSILES, SURFACE TO SURFACE, HYPERVELOCITY VEH
ICLES, LIQUID ROCKET PROPELLANTS, MOTION, BOOSTER ROCKETS, ELASTIC-ITY,
*DYNAMICS, MOMENTS, STABILITY, STABILITY (LATERAL), STABILITY (LONGITUDI
NAL), AUTO-MATIC, STABILIZATION SYSTEMS, SERVO SYSTEMS, *CONTROL SYSTEMS
, AUTOMATIC PILOTS, MATHEMATI-CAL ANALYSIS, NUMERICAL ANALYSIS, FUNCTION
S, MATHEMATICAL PREDICTION, EQUATIONS.)   -

269 046   0123   HANDBOOK OF OPERATIONS AND SERVICE INSTRUCTIONS FOR
TEST SET, ELECTRONIC CIRCUIT, PLUG-IN UNIT QRC-133A(T).

269 046   0123   INSTRUCTIONS ARE GIVEN FOR THE OPERATION AND
MAINTENANCE OF TEST SET ELECTRONIC CIRCUIT, PLUGIN UNIT QRC-133A(T).
THIS UNIT IS DESIGNED TO TEST THE FOLLOWING MODULES OF BARRAGE JAMMER
QRC-133A(T) (1) POWER SUPPLY (2) VOLTAGE REGULATOR (3)
MODULATOR-POWER SUPPLY AND (4) INTERFERENCE GENERATOR. THE OUTPUTS OF
THESE MODULES ARE DISPLAYED ON VARIOUS METERS AND INDICATORS CONTAINED
IN THIS TEST SET. THE DISPLAYED OUTPUTS ARE EVALUATED TO DETERMINE THE
PERFORMANCE OF THE MODULE UNDER TEST. TO OBTAIN SIGNIFICANT TEST
RESULTS AND READINGS WHEN TESTING THE 4 MODULES OF THE QRC-133A(T)
SYSTEM, IT IS NECESSARY TO MAINTAIN THE SAME CONDITIONS UNDER WHICH THE
MODULES UNDER TEST NORMALLY OPERATE. DURING NORMAL OPERATION IN THE
QRC133A(T) SYSTEM, EACH OF THE 4 MODULES INTERACTS IN SOME WAY WITH AT
LEAST ONE OTHER MODULE. THE OUTPUT OF EACH MODULE IS AFFECTED BY
INHERENT LOADS IN THE ASSOCIATED MODULES.

269 046   0122   (HANDBOOKS, *INSTRUCTION MANUALS, *TEST SETS, *RADAR JA
MMING, *RADAR EQUIPMENT.) (TEST EQUIPMENT, ELECTRONIC CIRCUITS, MAINTE-N
ANCE, OPERATION.)   —
269 060   0124   SELF-ADAPTIVE CONTROL SYSTEMS. PART II. BLOCK
DIAGRAM MODELS FOR THE AIRFRAME, AND SOME APPROACHES TO ACTIVE
COMPENSATION,

269 060   0124   THE SECOND PHASE IS REPORTED OF A LONG-RANGE PROJECT
TO STUDY SELF-ADAPTIVE CONTROL PRINCIPLES AND APPLY THEM TO THE CONTROL
OF AIRCRAFT. THE PRIMARY PURPOSE OF THIS PHASE IS TO DEVELOP A
SUITABLE MATHEMATICAL MODEL FOR THE STUDY OF AIRCRAFT DYNAMICS
INCLUDING ALL DEGREES OF FREEDOM, AND THE SECONDARY PURPOSE IS TO TEST
THE FEASIBILITY OF USING ACTIVE COMPENSATORS IN THE AUTOPILOT AS A
BASIS FOR SELF-ADAPTIVE SCHEMES OF CONTROL. THE MODEL IS RESTRICTED TO
THAT OF A RIGID AIRFRAME, AND IS TREATED AS A BLOCK DIAGRAM BECAUSE OF
WELL ESTABLISHED CORRELATIONS BETWEEN THE BLOCK DIAGRAM AND A
DETERMINANTAL ARRAY ON ONE HAND, AND BETWEEN THE BLOCK DIAGRAM AND
ANALOG SIMULATION ON THE OTHER HAND. THE INITIAL MODEL IS HELD TO A
LINEAR FORM SINCE IT IS NECESSARY THAT THE MODEL BE REDUCIBLE TO
SIMPLER, WELL-KNOWN LINEAR BLOCK DIAGRAM MODELS WHEN THE PROPER
RESTRICTIONS ARE IMPOSED. ANALYSIS OF A LINEAR MODEL IS ALSO READILY
OBTAINED AND PROVIDES A BASIS FOR ESTIMATING THE IMPORTANCE OF
NONLINEAR EFFECTS WHICH CAN BE INTRODUCED BY THE INJECTION OF PROPERLY
DERIVED SIGNALS. THIS MODIFICATION OF THE MODEL CAN LEAD TO SIMULATION
STUDIES WHERE AN ANALYTIC TREATMENT IS IMPOSSIBLE.

269 060   0123   (JET PLANES, AIRPLANES, AIR-CRAFT, *CONTROL SYSTEMS, *S
ERVO SYSTEMS, *AUTOMATIC PILOTS, MATHEMATICAL ANALYSIS, OPERATIONAL CALC
ULUS, DETERMINANTS, DESIGN.) (AIRFRAMES, DYNAMICS, STABILITY, YAW, PITCH
, ROLL, MATHEMATICAL ANALYSIS.)   —
269 065   0125   HELIX COUPLERS FOR LINEAR-BEAM DEVICES,

269 065   0125   THE INTERACTION BETWEEN ELECTRON BEAMS AND COUPLED
HELICES IS STUDIED AND GENERALIZED TO INCLUDE THE EFFECTS OF (1) SPACE
CHARGE, QC (2) FINITE CIRCUIT LOSS, D (3) FINITE VALUES OF GAIN
PARAMETER, C (4) AN UNRESTRICTED COUPLING PARAMETER, K AND (5) THE
EFFECT OF HAVING A LARGE POSITIVE VALUE OF THE VELOCITY PARAMETER, B,
SUCH THAT THE PROPAGATION CONSTANTS ARE PURELY IMAGINARY. A GENERAL
DETERMINANTAL EQUATION INCLUDING ALL THESE FACTORS IS DERIVED FROM THE

COUPLED-CIRCUIT EQUATIONS AND THE STREAM EQUATION. CURVES OF THE
PROPAGATION CONSTANTS FOR A VARIETY OF OPERATING PARAMETERS ARE SHOWN.
   ATTENTION IS CALLED TO THE FACT THAT A REGION OF GROWING WAVE IS
FOUND FOR LARGE POSITIVE B FOR EXTREMELY TIGHT COUPLING. THE EXTENT TO
WHICH THE GROWING-WAVE ISLAND IS AFFECTED BY THE VARIOUS OPERATING
PARAMETERS IS ILLUSTRATED. EQUATIONS FOR THE OUTER AND INNER HELIX RF
VOLTAGES ARE DERIVED FROM WHICH CURVES OF THE PROPAGATING RF POWERS
ALONG THE HELICES ARE COMPUTED AND PLOTTED.

269 065   0124   (*TRAVELING WAVE TUBES, *MICRO-WAVE AMPLIFIERS, *COUPLI
NG CIRCUITS, ELECTRONIC CIRCUITS, HELIXES.) (ELECTRON BEAMS, SPACE CHAR
GES, RADIOFREQUENCY POWDER, THEORY, MATHEMATICAL ANALYSIS.)   —
269 073   0126   SOME USEFUL INFORMATION FOR THE DESIGN OF AIRCORE
SOLENOIDS, PART I. RELATIONSHIPS BETWEEN MAGNETIC FIELD, POWER,
AMPERE-TURNS AND CURRENT DENSITY. PART II. HOMOGENEOUS MAGNETIC
FIELDS,

269 073   0126   RELATIONSHIPS RELATING POWER, MAGNETIC FIELD,
CURRENT DENSITY, AND AMPERE-TURNS IN TERMS OF CERTAIN DIMENSIONLESS
FACTORS ARE SUMMARIZED FOR MANY TYPES OF COIL GEOMETRIES AND CURRENT
DISTRIBUTIONS. A NUMBER OF PLOTS OF THESE FACTORS ARE PRESENTED. THE
FIELD HOMOGENEITY IN MAGNET STRUCTURES IS PRESENTED IN TERMS OF A
SERIES EXPANSION ABOUT THE ORIGIN UTILIZING LEGENDRE POLYNOMIALS. A
NUMBER OF TABLES TO FACILITATE DESIGN OF HOMOGENEOUS FIELDS ARE
PRESENTED. A METHOD OF ACHIEVING HOMOGENEITY IN LONG SOLENOID
STRUCTURES BY THE USE OF DETERMINANTS IS DISCUSSED. EXPRESSIONS FOR
THE AXIAL FIELD FROM UNIFORM AND RADIALLY VARYING CURRENT DENSITY COILS
ARE GIVEN.

269 073   0125   (*COILS, GEOMETRY, AIR, MAGNETIC CORES, *SOLENOIDS, DES
IGN.) (POWER, MAGNETIC FIELDS, ELECTRIC CURRENTS, DENSITY.) (TAYLOR S
SERIES, POLYNOMIALS, MATRIX ALGEBRA, ALGEBRA, INTEGRALS.) TABLES.   —
269 074   0127   SOME USEFUL INFORMATION FOR THE DESIGN OF IRON
MAGNETS. PART I. THE CALCULATION OF GAP FIELDS BY MEANS OF EQUIVALENT
SURFACE POLES. PART II. THE CALCULATION OF GAP FIELDS BY MEANS OF
DISTRIBUTED VOLUME DIPOLES. PART III. ANALYSIS OF EXISTING MAGNETS,

269 074   0127   THE CALCULATION OF GAP FIELDS IN IRON MAGNETS BY
MEANS OF EQUIVALENT SURFACE POLES HAS BEEN EXPLORED BY SEVERAL
AUTHORS. THIS WORK IS ENLARGED AND THE RESULTS COMPARED WITH THE
PERFORMANCE OF A WIDE RANGE OF COMMERCIAL MAGNETS. MAGNET CIRCUITS CAN
ALSO BE ANALYZED BY A VOLUME INTEGRAL OF DIPOLES. THIS REMOVES THE
RESTRICTION OF UNIFORM MAGNETIZATION AND ALLOWS THE OPTIMUM DIRECTION
OF MAGNETIZATION TO BE EXPLORED. GENERAL RESULTS ARE GIVEN FOR IRON
CYLINDERS, AND A NUMBER OF SPECIFIC TAPERED POLES ARE ANALYZED. THE
HOMOGENEITY OF FIELDS IN THE GAPS OF MAGNETS IS PRESENTED IN THE FORM
OF A TAYLOR SERIES OF ERROR COEFFICIENTS.

269 074   0126   (*IRON, *MAGNETS, DESIGN.) (*MAGNETIC FIELDS, MEASUREME
NT, MAGNET COILS, SEPARATION, MATHEMATICAL ANALYSIS, TAYLOR S SERIES, IN
TEGRALS.) ANALYSIS.   —

269 106   0128   THE SOVIET OIL OFFENSIVE AND INTER-BLOC ECONOMIC
COMPETITION,

269 106   0128   DATA ARE PRESENTED ON SOVIET OIL PRODUCTION AND
EXPORTS, AND ARE RELATED TO THE BROADER EAST-WEST ECONOMIC STRUGGLE.
THE SOVIET OIL EXPORT DRIVE ILLUSTRATES THREE ASPECTS OF INTER-BLOC
RIVALRY COMPETITION IN ECONOMIC AND TECHNOLOGICAL ACHIEVEMENT,
COMPETITION FOR INFLUENCE, AND COMPETITION FOR MARKETS. IN EACH THE
SOVIET OIL OFFENSIVE HAS ACHIEVED CONSIDERABLE SUCCESS. THE STUDY
ASSESSES THE EFFECTS OF SOVIET OIL EXPORTS ON THE WEST AS BOTH CONSUMER
AND PRODUCER OF OIL. AS CONSUMER, THE WEST CAN GAIN FROM LOWER PRICES
BUT RUNS THE RISK OF A LESS RELIABLE OIL SUPPLY. MEASURES ARE
DISCUSSED FOR REDUCING THIS RISK BY ENSURING THE AVAILABILITY OF
ALTERNATIVE SUPPLIES.

269 106   0127   (*USSR, *ECONOMIC CONDITIONS, *MINERAL OILS, FOREIGN PO
LICY.)   -
269 132   0129   COATINGS FOR REFRACTORY METALS, FORMED BY ANODIC
TREATMENT AND BY VAPOR DEPOSITION.

269 132   0129   PREPARATION OF ANODIC COATINGS ON NB, TA, MO, AND W
WAS INVESTIGATED. THE OBJECT WAS TO MODIFY SUCH COATINGS BY ANODICALLY
INCORPORATING ELEMENTS KNOWN TO FORM OXIDATION PROTECTIVE ALLOYS WITH
THESE REFRACTORY BASIS METALS, AND TO CONVERT THE MIXED COATINGS TO A
HIGH-TEMPERATURE OXIDATION PROTECTIVE FILM BY SUBSEQUENT REDUCTION AND
SINTERING. ANODIZING WAS CARRIED OUT IN BOTH AQUEOUS SOLUTIONS AND IN
MOLTEN SALTS.   SUCCESSFUL COATINGS WERE NOT OBTAINED. ATTEMPTS TO
FORM ALUMINIDE COATINGS BY DIFFUSION OF ELECTRODEPOSITED AL, FOLLOWED
BY ANODIZING, WERE ALSO UNSUCCESSFUL. EFFORTS WERE TURNED TO THE
PREPARATION OF COATINGS BY COMBINING ELECTRODEPOSITION AND VAPOR
DEPOSITION. CHROMIUM SILICIDE COATINGS, FORMED BY VAPOR PHASE
SILICIDING OF ELECTRODEPOSITED CR, WERE INVESTIGATED. SOUND COATINGS
WERE NOT OBTAINED FROM HYDROGEN REDUCTION OF SICL4 DUE TO CHEMICAL
DISPLACEMENT REACTION WITH THE BASIS CR. SILICIDING WITH MONOMETHYL
AND TETRAMETHYL SILANE AVOIDED THE DISPLACEMENT REACTION AND YIELDED
SOUND SILICON CARBIDE COATINGS. HOWEVER, THESE COATINGS FAILED TO
PROVIDE GOOD OXIDATION PROTECTION AT 1100 C IN AIR, DUE TO SPALLING.
THE DIFFERENTIAL THERMAL COEFFICIENT OF EXPANSION WITH RESPECT TO THE
BASIS METAL WAS THE PROBABLE CAUSE OF FAILURE.

269 132   0128   (*COATINGS, *OXIDATION INHIBI-TORS, *REFRACTORY MATERIA
LS, NIOBIUM, TANTALUM, MOLYBDENUM, TUNGSTEN, ELECTRODEPOSITION, VAPOR PL
ATING, ANODES (ELECTROLYTIC CELL).) (OXIDES, ALUMINUM, SILICIDES, CHROMI
UM PLATING.) HIGH TEMPERATURE RESEARCH.   -
269 137   0130   ION EXCHANGE-PHOTOMETRIC DETERMINATION OF TANTALUM
IN VANADIUM ALLOYS.

269 137   0130   A METHOD WAS DEVELOPED FOR THE DETERMINATION OF
TANTALUM IN VANADIUM ALLOYS. TANTALUM IS DETERMINED PHOTOMETRICALLY
WITH PYROGALLIC ACID FOLLOWING A SEPARATION BY ION EXCHANGE. A
DETAILED PROCEDURE IS GIVEN.

269 137   0129   (*VANADIUM ALLOYS, *TANTALUM, CHEMICAL ANALYSIS, ION EX
CHANGE, SOLVENT EXTRACTION, SEPARATION, PHOTOMETERS.) (RE-AGENTS, NITRI
C ACID, HYDROGEN COMPOUNDS, FLUORIDES, HYDROXIDES, BENZENES.)   -

269 138   0131   PREPARATION OF THE FLUOROSULFONATES   KI(SO3F)4,
KBR(SO3F)4, SNCL(SO3F)3, AND CRO2(SO3F)2,

269 138   0131   PEROXYDISULFURYL DIFLUORIDE, S2O6F2, REACTS WITH
SOME CHLORIDES TO REPLACE CL BY THE FLUOROSULFONATE GROUP. THIS TYPE
OF REACTION WAS USED TO PREPARE SNCL(SO3F)3 FROM SNCL4 AND CRO2(SO3F)2
FROM CRO2CL2. S2O6F2 FAILS TO REPLACE THE HALOGEN IN KBR OR KI WHEN
REACTING AT ABOUT ROOM TEMPERATURE. INSTEAD, THE COMPLEX SALTS,
KBR(SO3F)4 AND KI(SO3F)4, ARE FORMED.

269 138   0130   (*FLUORIDES, *SULFONATES OF POTASSIUM COMPOUNDS, IODATE
S OF BROMINE COM-POUNDS OR DIOXIDES, CHROMIUM COMPOUNDS OR CHLORIDES, TI
N COMPOUNDS, COMPLEX COMPOUNDS, SYNTHESIS.)   —
269 141   0132   INVESTIGATION OF A VARIATIONAL PRINCIPLE FOR OPEN
SYSTEMS,

269 141   0132   AN ATTEMPT TO OBTAIN INFORMATION ABOUT THE
STATIONARY NONEQUILIBRIUM STATE OF A FLUID THROUGH WHICH HEAT IS
FLOWING IS DESCRIBED. THE FLUID IS IN CONTACT WITH SEVERAL HEAT
RESERVOIRS AT DIFFERENT TEMPERATURES AND IS ASSUMED TO BE DESCRIBED BY
AN ENSEMBLE DENSITY WHICH SATISFIES A GENERALIZED LIOUVILLE EQUATION.
OUR METHOD CONSISTS OF MINIMIZING A POSITIVE FUNCTIONAL WHICH VANISHES
ONLY WHEN THE CORRECT STATIONARY SPACE DISTRIBUTION IS ASSUMED.

269 141   0131   (*FLUID FLOW, *HEAT TRANSFER, HYDRODYNAMICS, THERMODYNA
MICS, ENERGY, CHEMICAL EQUILIBRIUM, ENTROPY, THERMAL CONDUCTIVITY, PARTI
CLES, TRANSPORT PROPERTIES.) (*CALCULUS OF VARIATIONS, PARTIAL DIFFEREN
TIAL EQUATIONS, TENSOR ANALYSIS.)   —
269 142   0133   FINAL REPORT 1 OCTOBER 1959 — 1 OCTOBER 1961,

269 142   0133   THIS WORK IS IN THE FIELD OF STATISTICAL MECHANICS.
THE GOAL OF STATISTICAL MECHANICS IS TO PREDICT THE OBSERVED PROPERTIES
OF MACROSCOPIC OBJECTS FROM THE PROPERTIES OF THE ATOMS MAKING UP THESE
OBJECTS. THIS INCLUDES SUCH DIVERSE PROBLEMS AS CHANGE OF PRESSURE
WITH TEMPERATURE, THE AMOUNT OF HEAT TRANSPORTED BY A METAL BAR WHOSE
ENDS ARE KEPT AT DIFFERENT TEMPERATURES, AND THE RATE AT WHICH A LIQUID
WILL FLOW THROUGH A CHANNEL.

269 142   0132   (*QUANTUM STATISTICS, *FLUIDS, *FLUID MECHANICS, THERMO
DYNAMICS, *GASES, *MOLECULES, *PARTICLES, KINETIC THEORY.) (TEMPERATURE,
 TRANSPORT PROPERTIES, METALS, SHEETS.) (DISTRIBUTION THEORY, STATISTIC
AL FUNCTIONS, STATISTICAL DISTRIBUTIONS, PARTIAL DIFFERENTIAL EQUATIONS,
 INTEGRATION, VECTOR ANALYSIS, TAYLOR S SERIES, MATRIX ALGEBRA, PROBABIL
ITY.)   —
269 785   0134   HIGHLY CHLORINATED MATERIALS FOR OXIDATIONAND
HEAT-RESISTANT PLASTICS.

269 785   0134   THE TEXT OF THE ARTICLE WHICH CONTAINS A BRIEF
OUTLINE OF METHODS FOR OBTAINING HEXACHLOROCYCLOPENTADIENE, IS
DOCUMENTED BY MORE THAN 60 REFERENCES, MANY OF WHICH ARE SOVIET. THE
WORK BY L. M. KOGAN AND OTHERS CITED DATES FROM 1958 THROUGH 1961. THE
PART OF THE ARTICLE DEALING WITH HEXACHLOROCYCLOPENTADIENE IS
REPRESENTATIVE OF SOVIET INTEREST IN HIGHLY CHLORINATED POLYMERS
BECAUSE OF THEIR HEAT AND OXIDATION RESISTANCE. AN IMPROVEMENT IN THE
TECHNOLOGY OF ANOTHER HIGHLY CHLORINATED MONOMER, CHLORENDIC
ANHYDRIDE, WAS REPORTED PREVIOUSLY. (NOTE   THIS ABSTRACT VIRTUALLY
COMPRISES THE ENTIRE REPORT).

269 785   0133   (*HEAT RESISTANT POLYMERS,   MATERIALS, *CYCLOPENTENES,
CHLORIDES, POLYMERS, SYNTHESIS, CHLORINATION, USSR.)   -
269 795   0135   TRACKING OF MISSILES AND SPACE VEHICLES. REVIEW OF
SOVIET LITERATURE.

269 795   NO ABSTRACT AVAILABLE

269 795   0134   (*PLASMA PHYSICS, ELECTRO-MAGNETIC PROPERTIES, *IONOSPH
ERIC DISTURBANCES, IONS, METEORS, ELECTRONS, DENSITY, IONOSPHERE, UPPER
ATMOSPHERE, MOLECULES, *RADIO ASTRONOMY, EXTRATERRESTRIAL RADIO WAVES, S
CIENTIFIC RESEARCH.) (SATELLITE VEHICLES, GUIDED MIS-SILES, SURFACE TO
SURFACE, RADAR TRACKING, RADIO INTERFEROMETERS, TRACKING.) USSR.   -
269 796   0136   THEORETICAL PERFORMANCE BOUNDS FOR VARIABLE DATA RATE
TRANSMISSIONS ON FADING CIRCUITS,

269 796   0136   VARIABLE DATA RATE TRANSMISSIONS ARE CONSIDERED AS A
MEANS OF COUNTERACTING ADVERSE EFFECTS OF FADING. THEORETICAL BOUNDS
ON ATTAINABLE IMPROVEMENTS ARE DERIVED AS A GUIDELINE TO MORE
EXHAUSTIVE STUDIES. IT IS SHOWN THAT RELATIVELY SIMPLE SUBOPTIMUM
SYSTEMS OFFER VIRTUALLY AS GOOD PERFORMANCE AS THE MOST ELABORATE
SYSTEM.

269 796   0135   (*DATA TRANSMISSION SYSTEMS, *COMMUNICATIONS THEORY, TE
STS, ANALYSIS, ERRORS, PROBABILITY, FREQUENCY SHIFT, FRE-QUENCY SHIFT KE
YERS, BAND-PASS FILTERS, CIRCUITS.)   -
269 854   0137   NOTE ON THE AXISYMMETRY OF AN ELECTRODELESS
DISCHARGE,

269 854   0137   THE VACUUM ELECTRIC FIELD IN A CONFIGURATION IS
STRONGLY NON-AXISYMMETRIC, BUT THE POLARIZATION OF THE GAS INSIDE THE
COIL COMPLETELY COMPENSATES THE NON-AXISYMMETRIC COMPONENT, LEAVING AN
AXISYMMETRIC FIELD.

269 854   0136   (*ELECTRIC DISCHARGES, *MAGNETIC FIELDS, *CONFIGURATION
, VACUUM SYSTEMS, *ELEC-TRIC FIELDS, *COILS.) (GAS IONIZATION, POLARI-Z
ATION, ELECTRONS, DENSITY, IONS, VORTICES, VECTOR ANALYSIS.)   -
269 867   0138   RESEARCH AND DEVELOPMENT OF A PROTON SPECTROMETER.

269 867   0138   A PROTON SPECTROMETER SYSTEM HAS BEEN DEVELOPED TO
MEASURE THE FLUX AND ENERGY SPECTRUM OF PROTONS ABOVE 1 MEV IN THE VAN
ALLEN RADIATION BELTS AND INTERPLANETARY SPACE. THE INSTRUMENT WILL BE
FLOWN ON THE ADVENT SATELLITE AND OTHER AIR FORCE VEHICLES TO OBTAIN
INFORMATION PERTINENT TO RELIABILITY OF SATELLITE COMPONENTS IN THE
SPACE ENVIRONMENT.

269 867   0137   (DESIGN OF *SPECTROPHOTOMETERS FOR SPECTROGRAPHIC ANALY
SIS OF ENERGY, *PROTONS, VAN ALLEN RADIATION BELT.) (SATELLITE VEHICLES
, INSTRUMENTATION.) (*SCINTILLATION COUNTERS, CRYSTALS, PHOTO-MULTIPLIE
RS.) (CESIUM COMPOUNDS, IODIDES, PULSE HEIGHT ANALYZERS.)   -
269 834   0139   TOTAL SYSTEM CONCEPT FOR A NAVY STOCK POINT,

269 834   0139   THIS REPORT PRESENTS A NEW DATA-PROCESSING CONCEPT
FOR NAVY STOCK POINTS. THE REPORT IS BASED ON THE FOLLOWING PRECEPTS
(1) THE OBJECTIVE OF THE TOTAL SYSTEM IS RAPID, PREDICTABLE ISSUES TO
CUSTOMERS, WITH THE LATTER OF PREDOMINANT IMPORTANCE SINCE PREDICTABLE
LEAD TIME WILL ENABLE CUSTOMERS TO ADJUST THEIR OPERATIONS TO SUPPLY

CAPABILITIES IN AN OPTIMUM MANNER. (2) THE ACHIEVEMENT OF THE TOTAL SYSTEMS OBJECTIVE REQUIRE THAT THE ENTIRE ISSUE PROCESSING CYCLE AT A STOCK POINT I.E., THE TOTAL SYSTEM BE CONSIDERED AS A UNIT. THE DATA-PROCESSING REQUIREMENTS OF ALL OF THE FUNCTIONAL AREAS MUST BE CONSIDERED, AND THESE REQUIREMENTS MUST BE DEFINITIVELY ALIGNED WITH AND EXPEDITE THE MATERIAL-PROCESSING SYSTEM AND SHIPPING REQUIREMENTS. (3) THE NEW CONCEPT APPLIES TO ALL MAJOR STOCK POINTS, REGARDLESS OF TYPE OR MISSION.

269 834   0138   (*DATA PROCESSING SYSTEMS, *NAVAL LOGISTICS, RECORDS, N AVAL SUPPLIES.) MANAGEMENT ENGINEERING.   —
269 811   0140   ANTENNA — AT-601(XE-3)/TRN.

269 811   0140   THE DEVELOPMENT AND FINAL DESIGN EFFORTS ARE DISCUSSED OF A PROTOTYPE MODEL OF THE AT-601 (XE-3)/TRN ANTENNA FOR THE RADIO BEACON SYSTEM AN/TRN-9. DETAILED CONSIDERATION IS GIVEN TO (1) THE ELECTRICAL DESIGN OF THE RADIATION AND FEED CIRCUITS FOR THE ANTENNA CONE AND FAN ARRAYS, (2) MATCHING TECHNIQUE FOR OBTAINING 1.2 VSWR, (3) EVALUATION OF THE NECESSITY OF A GROUND PLANE AND THE FINAL CHOICE OF GROUND PLANE MATERIAL, (4) MECHANICAL REDESIGN TO OBTAIN A RUGGED, PORTABLE, AND EASILY ASSEMBLED UNIT, (5) THE CHOICE OF THE RADIATION ELEMENT MATERIAL AND THE MEANS FOR RADIATION ELEMENT QUICK DISCONNECT, (6) RADIATION PATTERN MEASUREMENTS, (7) FLIGHT TEST MEASUREMENT ON THE ANTENNA, AND (8) ENVIRONMENTAL TESTING.

269 811   0139   (*RADIO BEACONS, *ANTENNAS, ANTENNA HARDWARE, ANTENNA M ASTS, MOBILE, TRANSMISSION LINES, GLASS TEXTILES, DESIGN, ANTENNA RADIAT ION PATTERNS, STANDING WAVE RATIOS, TESTS, RADIO NAVIGATION.)   —
269 829   0141   AIRCRAFT LANDING SYSTEM COMPATIBILITY STUDY. U-3A. AN/GSN-5.

269 829   0141   THE LANDING CONTROL, CENTRAL, AN/GSN-5 IS A GROUND-BASED, FINAL APPROACH NAVIGATION SYSTEM PROVIDING THREE BASIC APPROACH AND LANDING TECHNIQUES, NAMELY, COMPLETELY AUTOMATIC CONTROL, CROSS-POINTER GUIDED APPROACH, AND TALKDOWN. THESE TECHNIQUES MAY BE USED SINGULARLY OR IN COMBINATION. IN ALL CASES, HOWEVER, AIRCRAFT SURVEILLANCE AND GUIDANCE INFORMATION ARE MAINTAINED TO TOUCHDOWN. THE STUDY OF THE COMPATIBILITY OF THE U-3A AIRCRAFT, THE L-2 AUTOPILOT, AND THE LANDING CONTROL, CENTRAL, AN/GSN-5 INDICATES THAT, WITH THE AIRBORNE AND GROUND UNITS CONFORMING TO THE PERFORMANCE REQUIREMENTS STATED HEREIN, THE AIRCRAFT AND THE AN/GSN-5 SYSTEM ARE COMPATIBLE, AND THAT SATISFACTORY ALL WEATHER AUTOMATIC FINAL APPROACHES AND LANDINGS CAN BE MADE. THE AIRCRAFT IS ALSO COMPATIBLE WITH THE AN/GSN-5 SYSTEM FOR CROSS-POINTER OR TALKDOWN GUIDED APPROACHES.

269 829   0140   (*LIAISON PLANES, INSTRUMENT LANDINGS, ALL-WEATHER AVIA TION, *GROUND CON-TROLLED APPROACH RADAR, SERVO SYSTEMS, CONTROL SYSTEMS , RADAR TRACKING, RADAR EQUIPMENT, AUTO-MATIC PILOTS, NAVIGATION COMPUTE RS, STABILITY, ERRORS, DESIGN, SIMULATION BY ANALOG COMPUTERS, DIGITAL C OMPUTERS.) RADAR ECHO AREAS.   —

269 832   0142   TABLES OF CYLINDRICAL BLAST FUNCTIONS FOR GAMMA
EQUALS 5/3 AND GAMMA EQUALS 7/5,

269 832   0142   TABLES OF SIMILARITY FUNCTIONS DEFINING THE FLOW
FIELD BEHIND EXPANDING CYLINDRICAL SHOCK WAVES ARE PRESENTED HERE FOR
VALUES OF 5/3 AND VALUES OF 7/5.   A BRIEF DISCUSSION INCLUDES THE
DIFFERENTIAL EQUATIONS AND BOUNDARY CONDITIONS FOR THESE FUNCTIONS
TOGETHER WITH AN ANALYTICAL SOLUTION FOR THEM.

269 832   0141   (SHOCK WAVES, *BLAST, CYLIN-DRICAL BODIES, GAS FLOW, *F
UNCTIONS, *TABLES.) (NUMERICAL ANALYSIS, DIFFERENTIAL EQUATIONS.) (WIRE,
 DETONATION, SHOCK WAVES, BLAST.) SPECIFIC HEAT.   -
269 889   0143   STUDIES IN DETERRENCE.   IV. THE PROSPECTS FOR FUTURE
ARMS—CONTROL NEGOTIATIONS,

269 889   0143   WHILE GENERAL SPECULATIONS ON THE FUTURE POLICY OF
THE SOVIET UNION ENCOUNTER MANY DIFFICULTIES, THE FACT THAT THE SOVIET
NEGOTIATORS HAVE FOLLOWED A DISTINCT PATTERN IN THE ARMS—CONTROL AREA
PERMITS AN EXTRAPOLATION OF TRENDS INTO LIKELY ALTERNATIVES WITHIN
BROAD LIMITS.   THREE OF THESE ARE CONSIDERED IN DETAIL, TOGETHER WITH
LIKELY U. S. RESPONSES.   THESE INCLUDE (A) SOVIET PROPOSALS FOR GENERAL
AND COMPLETE DISARMAMENT,   (B) SOVIET PROPOSALS FOR LIMITED
ARMS—CONTROL MEASURES, AND (C) SOVIET PROPOSALS BASED ON U. S. IDEAS
DEVELOPED DURING THE LAST FEW YEARS.   EACH IS EXPLORED IN SOME DETAIL
TOGETHER WITH POSSIBLE   U. S. RESPONSES.

269 889   0142   (*FOREIGN POLICY, *POLITICAL SCIENCE, *USSR, CONTROL OF
 WAR POTENTIAL.)   -
269 853   0144   RADOME MODEL 128B10005.

269 853   0144   THIS REPORT INCLUDES   BRUNSWICK CORP., MARION, VA.
GRUMMAN DESIGN 128. MONTHLY PROGRESS REPT. 1-31 AUG 61, BY
H. L. HUFF. (BC REPT. NO. 1260-EE) (SUBCONTRACT TO GRUMMAN AIRCRAFT
ENGINEERING   CORP., BETHPAGE, N. Y., CONTRACT NOA(S) 58-524-C)
BRUNSWICK CORP., MARION, VA.   GRUMMAN DESIGN 128.   MONTHLY PROGRESS
REPT., 1 SEP-31 OCT 61, BY H. L. HUFF. (BC REPT. NO. 1260-FF)
9SUBCONTRACT TO GRUMMAN AIRCRAFT ENGINEERING   CORP., BETHPAGE, N. Y.,
CONTRACT NOA(S) 58-524-C)

269 853   0143   (*RADOMES OF EPOXY RESINS,   PLASTICS, DESIGN, PROCESSIN
G.)   -
269 844   0145   ANALYSIS OF AN INTEGRATED BISTABLE MULTIVIBRATOR.

269 844   0145   A TYPICAL REALIZATION OF AN INTEGRATED BISTABLE
MULTIVIBRATOR IS PROPOSED AND ANALYZED.   IT IS FOUND THAT THE
INTEGRATED REALIZATION IS SLOWER THAN ITS LUMPED COUNTERPART.   THIS
DECREASED SPEED OF OPERATION RESULTS (A) FROM EXCESS MINORITY CARRIER
STORAGE IN THE BULK SEMICONDUCTOR MATERIAL WHICH FORMS THE TRANSISTOR
COLLECTOR REGIONS AND CIRCUIT RESISTANCES, AND   (B) FROM THE VOLTAGE
DEPENDENCE OF THE LARGE AREA   P-N JUNCTIONS WHICH FORM THE CROSS
COUPLING NETWORKS.

269 844   0144   (*VIBRATORS, *CIRCUITS,   SEMICONDUCTORS, CAPACITORS, TR
ANSISTORS, DESIGN.)   -

269 874   0146   SOLID STATE LOGARITHMIC PULSE AMPLIFIER,

269 874   0146   THE USE OF A ZENER DIODE AS THE LOGARITHMIC ELEMENT
IN PULSE LOGARITHMIC AMPLIFICATION IS DESCRIBED. A SPECIFIC THREE
DECADE PULSE LOGARITHMIC AMPLIFIER USING THE ZENER DIODE AND
TRANSISTORIZED CIRCUIT IS PRESENTED.

269 874   0145   (TRANSISTOR AMPLIFIERS, *PULSE AMPLIFIERS WITH DIODES.)
   (*PHOTOMULTIPLIERS, CIRCUITS.)   -
269 807   0147   NO TITLE AVAILABLE

269 807   0147   NO ABSTRACT AVAILABLE

269 807   0146   (TESTS WITH LEAST SQUARES METHOD.) (INSTRUMENTATION F
OR MEASUREMENT OF *GUIDED MISSILE TRAJECTORIES.) (TEST EQUIP-MENT FOR M
ODEL TESTS OF BACTERIAL AEROSOLS.) (CALIBRATION OF DETECTORS OF PARTICLE
S IN *AEROSOLS.) (*AREA BOMBING, EFFECTIVENESS.) (SAFETY OF ARMIES FROM
 GUIDED MISSILES.) (DATA PROCESSING SYSTEMS, ANALYSIS.) (TESTS.)   -
269 873   0148

269 873   0148   THE ROOM TEMPERATURE DEFORMATION BEHAVIOR OF FE-AL
ALLOYS NEAR THE COMPOSITION FE3AL WAS STUDIED AS A FUNCTION OF
QUENCHING TEMPERATURE (DEGREE OF ORDER). A SLIP TRACE STUDY SHOWED
(110) TO BE THE DOMINANT SLIP PLANE WITH (211) AND (321) ALSO
PARTICIPATING. THE RELATIVE SLIP PLANE PREFERENCE WAS INDEPENDENT OF
THE QUENCHING TEMPERATURE. THE YIELD STRESS OF POLYCRYSTALLINE
SPECIMENS AND THE CRITICAL RESOLVED SHEAR STRESS OF SINGLE CRYSTALS WAS
DETERMINED AS A FUNCTION OF QUENCHING TEMPERATURE. A SECOND STRENGTH
MAXIMUM WAS ALSO OBSERVED IN THE 700 TO 750 C QUENCHING TEMPERATURE
RANGE X-RAY RESULTS SHOWED COMPLETE SUPPRESSION OF FE3AL TYPE ORDER,
AND NO VARIATION IN THE DEGREE OF RETAINED FEAL TYPE ORDER. A THIRD
STRENGTH VS QUENCHING TEMPERATURE RISE WAS OBSERVED AT ABOUT 900 C,
WHICH IT IS SUGGESTED MAY BE DUE TO VACANCY STRENGTHENING. YOUNG'S
MODULUS EXHIBITED ANOMALOUS BEHAVIOR, INCREASING WITH INCREASING
QUENCHING TEMPERATURE. THE YOUNG'S MODULUS BEHAVIOR DID NOT CORRELATE
WITH THE DISORDERING OF THE FE3AL SUPERLATTICE.

269 873   0147   (*PHASE STUDIES, PHASE TRANSI-TIONS, *MOLECULAR ASSOCIA
TION OF IRON IN *IRON ALLOYS, *ALUMINUM ALLOYS, DEFORMATION, TEMPERATURE
, HEAT TREATMENT.) (POLYMERS, CRYSTALS, SINGLE CRYSTALS, LATTICES, CRYS
TAL STRUCTURE, SHEAR STRESSES, TENSILE PROPERTIES, STRAIN GAGES, X-RAY D
IFFRACTION ANALYSIS.)   -
269 804   0149   RELIABILITY STUDY FOR HIGH POWER TRANSISTORS.

269 804   0149   NO ABSTRACT AVAILABLE

269 804   0148   (*TRANSISTORS, *RELIABILITY, LIFE EXPECTANCY, TESTS, TE
ST METHODS, TEST EQUIPMENT.)   -
269 883   0150   TRANSIENT HEAT AND MOISTURE TRANSFER TO SKIN THROUGH
THERMALLY IRRADIATED CLOTH,

269 883   0150   A STUDY WAS MADE OF THE ACTION OF CLOTH IN
PROTECTING SKIN FROM THERMAL INJURY RESULTING FROM EXPOSURE TO
HIGH-INTENSITY THERMAL RADIATION. METHODS WERE DEVELOPED TO OBTAIN
TEMPERATURETIME-DEPTH DATA FOR A SYSTEM SIMULATING SKIN COVERED BY A
LAYER OF DRY OR MOIST CLOTH. EXPERIMENTALLY THIS WAS ACCOMPLISHED BY
THE USE OF A COPPER-AIR SIMULANT WHICH ACCEPTS HEAT AT THE SAME RATE AS

HUMAN SKIN BUT DEVELOPS A PROPORTIONALLY STRETCHED TEMPERATURE
PROFILE. THE METHOD FACILITATES THE INSPECTION OF THE INFLUENCES ON
TEMPERATURE DISTRIBUTION IN THE SKIN OF VARIOUS SYSTEM PROPERTIES AND
THE SURROUNDING CONDITIONS. THE SKIN ENTHALPY RISE ABOVE A CRITICAL
TEMPERATURE LEVEL, A FEASIBLE BASIS FOR CORRELATING BURN DATA, WAS
FOUND TO BE VERY SENSITIVE TO SLIGHT VARIATIONS IN THE TEMPERATURE
RESPONSE AND DESERVES FURTHER TESTING.

269 883   0149   (*SKIN, BURNS, INHIBITION, SIM-ULATION.)   (PROTECTIVE C
OVERINGS, *PROTECTIVE CLOTHING, FIRE PROTECTIVE CLOTHING, MATERIALS, TEX
TILES, COTTON TEXTILES, *HEAT TRANSFER, THERMAL CONDUCTIVITY, COLORS, MO
ISTURE, MATH-EMATICAL ANALYSIS.)   (THERMAL RADIATION, THER-MAL INSULATIO
N, TEST METHODS, TEST EQUIPMENT.)   −
269 872   0151   VELOCITY REQUIREMENTS FOR TRANSFER BETWEEN CO-PLANAR,
CO-AXIAL ORBITS,

269 872   0151   THE TOTAL VELOCITY REQUIREMENTS FOR COPLANAR,
COTANGENTIAL TRANSFER BETWEEN ORBITS WITH A COMMON MAJOR DIAMETER ARE
EXAMINED. THE RESULTS ARE VALID FOR ASCENDING, DESCENDING,
INTERSECTING, AND NON-INTERSECTING ORBITS. COMPUTATIONAL RESULTS
OBTAINED USING THE AFIT IBM 1620 COMPUTER ARE PRESENTED FOR ELLIPTIC,
PARABOLIC, AND HYPERBOLIC OUTER ORBITS AS A FUNCTION OF THE TRANSFER
AND OUTER ORBIT GEOMETRIES. FOR THE PARABOLIC OUTER ORBIT, THE MAXIMUM
VELOCITY REQUIREMENT IS 18$ GREATER THAN THE ESCAPE VELOCITY AT THE
PERIAPSIS OF THE TRANSFER ORBIT WHEN THE TRANSFER ORBIT HAS AN
ECCENTRICITY OF 0.73. FOR HYPERBOLIC ORBITS, MAXIMUM VELOCITY
REQUIREMENTS OCCUR AT PARTICULAR ELLIPTICAL TRANSFER ORBITS WHERE THE
VELOCITIES AT INFINITY (I.E., THE HYPERBOLIC EXCESS), ARE LESS THAN ONE
THIRD THE REFERENCE ESCAPE VELOCITY.

269 872   0150   (CELESTIAL MECHANICS, *ORBITAL FLIGHT PATHS, SATELLITES
, SATELLITE VEHICLES, THRUST, SATELLITE VEHICLE TRAJECTORIES, VELOCITY,
MILITARY REQUIREMENTS, SPACE FLIGHT, MATHEMATICAL ANALYSIS, NAVIGATION C
OMPUTERS.)   −
269 422   0158   DEFLECTIONS AND STRESSES OF HEATED TRUSS TYPE
STRUCTURES BY A DIRECT STIFFNESS METHOD.

269 422   0158   THE TESTING AND STRESS ANALYSIS OF PIN-JOINTED TRUSS
TYPE STRUCTURES SUBJECTED TO AERODYNAMIC HEATING AND LOADING ARE
CONSIDERED. FORCE-DEFLECTION RELATIONSHIPS AND CORRESPONDING MEMBER
STRESSES WERE FOUND BY USE OF A DIRECT STIFFNESS METHOD. GEOMETRICAL
NON-LINEARITIES AND THE VARIATION WITH TEMPERATURE OF THE MODULUS OF
ELASTICITY AND THE COEFFICIENT OF LINEAR EXPANSION WERE ACCOUNTED FOR.
SOLUTIONS OBTAINED ON A DIGITAL COMPUTER SHOW LITTLE EFFECT OF
GEOMETRIC NON-LINEARITIES ON DISPLACEMENTS. THERE IS A MORE PRONOUNCED
EFFECT ON MEMBER STRESSES BUT THIS WAS ALSO SMALL FOR THE TRUSSES
EXAMINED. THIS METHOD IS A VALUABLE TOOL FOR STRESS ANALYSIS AND THE
FORCE-DEFLECTION RELATIONSHIPS OBTAINED MAY BE USED TO INDICATE
INCIPIENT FAILURE OF A STRUCTURE DURING TESTING.

269 422   0157   (*AIRFRAMES, STRUCTURES, AERO-DYNAMIC HEATING, LOAD DIS
TRIBUTION, DEFLEC-TION, DEFORMATION, STRESSES, TEST METHODS, MATHEMATICA
L ANALYSIS, MATHEMATICAL PREDICTION.)   *THESES.   −

269 510   0159   EFFECT OF SLIP ON THE LAMINAR BOUNDARY LAYER NEAR THE LEADING EDGE OF A FLAT PLATE IN HYPERSONIC RAREFIED GAS FLOW,

269 510   0159   NEAR THE LEADING EDGE OF A SHARP FLAT PLATE IN HIGH SPEED, LOW DENSITY FLOW OF HIGH TEMPERATURE GASES THE INDUCED SHOCK WAVE IS ALMOST STRAIGHT AND THE PRESSURE AND VELOCITY DOWNSTREAM ARE THEREFORE APPROXIMATELY CONSTANT. ASSUMING THAT THE OUTER EDGE OF THE VISCOUS LAYER COINCIDES WITH THE SHOCK WAVE IN THIS REGION OF THE FLOW, IT IS POSSIBLE TO INTEGRATE THE BOUNDARY LAYER EQUATIONS WITH FIRST ORDER SLIP IN THE BOUNDARY CONDITIONS AT THE PLATE USING A GORTLER-TYPE SERIES IN FRACTIONAL POWERS OF X, THE LONGITUDINAL DISTANCE ALONG THE PLATE. THE FIRST TWO TERMS IN THIS SERIES HAVE BEEN FOUND IN CLOSED, ANALYTICAL FORM. TO TERMS IN X TO THE FIRST POWER THE RESULT LEADS TO A CONSTANT VALUE OF THE SKIN FRICTION COEFFICIENT AND HEAT TRANSFER COEFFICIENT. AS AN EXAMPLE THE RESULT IS APPLIED TO A FLAT PLATE FLYING AT MACH NUMBER 20 AT 295,000 FEET ALTITUDE, WHERE THE EFFECTS OF SLIP ARE SIGNIFICANT FOR A CONSIDERABLE DISTANCE DOWNSTREAM OF THE LEADING EDGE.

269 510   0158   (SHEETS, GAS FLOW, AERODYNAMICS, *HYPERSONICS, *SUPERAE RODYNAMICS, SHOCK WAVES, BOUNDARY LAYER, *LAMINAR BOUNDARY LAYER, FRICTI ON, DRAG, HEAT TRANSFER, MATHEMATICAL ANALYSIS, DIFFERENTIAL EQUATIONS, PARTIAL DIFFERENTIAL EQUATIONS, INTEGRAL EQUATIONS, SERIES.)   —
269 731   0160   HEAT DISSIPATION THROUGH DIODE LEAD WIRES UNDER STEADY-STATE CONDITIONS,

269 731   0160   RESULTS OF AN INVESTIGATION OF THE CAPABILITIES OF WIRE LEADS TO FUNCTION AS HEAT DISSIPATING MEDIA ARE PRESENTED. EXPERIMENTAL WORK RELATED TO THIS PROJECT HAS CONFIRMED THAT LEADS MAY SERVE AS HEAT SINKS TO AN EXTENT GREATER THAN HAS GENERALLY BEEN RECOGNIZED, AND HAS ALSO SERVED AS A BASIS FOR DERIVATION OF THE THEORETICAL RELATIONSHIPS WHICH DEFINE THE SIGNIFICANT PARAMETERS INVOLVED. THE EXPERIMENTS WERE CONDUCTED TO GENERALLY DETERMINE THE EFFECTS OF VARYING WIRE LEAD MATERIALS, LENGTHS, AND DIAMETERS UNDER BOTH RADIATIVE AND CONVECTIVE AMBIENT CONDITIONS. THE MATHEMATICAL RELATIONSHIPS WHICH HAVE BEEN OBTAINED PROVIDE QUANTITATIVE METHODS FOR PREDICTING THE EFFECT AND BEHAVIOR OF COMPONENTGENERATED HEAT ON PERFORMANCE, AND WILL PERMIT BETTER CORRELATION BETWEEN COMPONENT WATTAGE RATINGS AS STATED BY THE MANUFACTURER AND NOTED BY THE USER. (AUTHOR) AD-269 7319N6

269 731   0159   (*HEAT TRANSFER, DIODES, WIRE, *CONDUCTORS, NICKEL, COP PER, THERMAL CONDUC-TIVITY, ELECTRIC CONNECTORS, TESTS, THERMO-DYNAMICS.) (EXPERIMENTAL DATA, TABLES, FUNCTIONS, EQUATIONS.)   —
269 823   0161   METABOLISM OF RUTHENIUM IN THE RAT,

269 823   0161   SEVENTEEN SPRAGUE-DAWLEY RATS WERE INJECTED INTRAMUSCULARLY AND INTRAPERITONEALLY WITH RUTHENIUM-106. THE AMOUNT OF THIS ISOTOPE WAS DETERMINED DAILY FOR 5 WEEKS IN THE URINE AND FECES. ANIMALS WERE SACRIFICED AT INTERVALS AND THE VARIOUS ORGANS WERE ANALYZED FOR RUTHENIUM. IT WAS NOTED FROM THIS EXPERIMENT THAT THE PATHWAYS OF ABSORPTION, METABOLISM, AND EXCRETION ARE DEPENDENT ON THE ROUTE OF ADMINISTRATION OF RUTHENIUM.

269 823   0160   (*METABOLISM, *RUTHENIUM, *FIS-SION PRODUCTS, EXPERIMEN TAL DATA.) (BIO-CHEMICAL TESTS, MEASUREMENT, ISOTOPES, ABSORP-TION, EXC RETION, OMENTUM, AUTORADIOGRAPHY.) *RADIOBIOLOGY.   —

269 856   0162   INVESTIGATION OF MOLYBDENUM-AND TUNGSTEN-BASE ALLOY
SHEET MATERIALS.

269 856   0162   OF THE 28 EXTRUSION BLANKS PREPARED FROM THE SIX
VACUUM-ARC-CASE, MOLYBDENUM - AND TUNGSTEN-BASE ALLOY INGOTS, 24 WERE
SUCCESSFULLY EXTRUDED AND 4 STUCK IN THE DIE DURING EXTRUSION. TWO
SHEET BARS FROM EACH OF THE FIVE COMPOSITIONS HAVE BEEN ROLLED TO
50-MIL-GAGE SHEET STOCK. PROCESSING HISTORY, RECOVERIES, AND
RECRYSTALLIZATION DATA ARE PRESENTED.

269 856   0161   (SHEETS, *MOLYBDENUM ALLOYS, *TUNGSTEN ALLOYS, EXTRUSIO
N, PROCESSING, ELECTRIC ARCS, VACUUM FURNACES, CASTING, HEAT TREATMENT,
CRYSTALLIZATION.)   -
269 814   0163   PROTOTYPE DEVELOPMENT MODEL 385 AIR REFUELING STORE.

269 814   0163   DEVELOPMENT OF THE BEECH MODEL AIR REFUELING HOSE
HAS CONTINUED WITH SATISFACTORY PROGRESS IN ALL AREAS EXCEPT CORRECTION
OF PREVIOUSLY REPORTED CLUTCH DEFICIENCIES DURING THIS INTERIM PERIOD.
THE FIRST PROTOTYPE IS COMPLETE TO THE EXTENT POSSIBLE WITHOUT
SATISFACTORY CLUTCHES. THE SECOND UNIT IS READY FOR STATIC TEST AND
THE THIRD UNIT IS PROGRESSING SATISFACTORILY. THE FIRST UNIT IS NOW
THIRTEEN DAYS BEHIND SCHEDULE DUE TO THE CURRENT CLUTCH PROBLEMS. NO
OTHER MAJOR PROBLEMS HAVE BEEN ENCOUNTERED.

269 814   0162   (FUEL SYSTEMS, *FUEL HOSE, TOWED BODIES FOR *REFUELING
IN FLIGHT, DESIGN.)   -
269 850   0164   EXPERIMENTAL DETERMINATION OF THE SLOW NO
DECOMPOSITION REGIME AROUND 3000 DEGREES K BEHIND SHOCK WAVES,

269 850   0164   THE DECOMPOSITION OF NITRIC OXIDE BETWEEN 2250 AND
3450 K HAS BEEN STUDIED IN SHOCK TUBE EXPERIMENTS. THE EMITTED
INFRARED RADIATION OF THE FUNDAMENTAL BAND SYSTEM OF NO HAS BEEN USED
TO DETERMINE THE TIME DURATION OF THE SLOW DECOMPOSITION REGIME OF NO
BEHIND SHOCK WAVES IN PURE NO. IT IS FOUND THAT THE TEMPERATURE
DEPENDENCY OF THE DURATION IS IN GOOD AGREEMENT WITH THE THEORETICAL
MODEL WE HAVE DESCRIBED PREVIOUSLY.

269 850   0163   (*SHOCK WAVES, *NITROGEN COM-POUNDS, *OXIDES, *INFRARED
 RADIATION, VELOCITY, MEASUREMENT, TEMPERATURE, DENSITY, OPTICAL SYSTEMS
.) (HEAT TRANSFER, GAGES, LOAD DISTRI-BUTION, MACH NUMBER, VACUUM SYSTE
MS, PHOTO-GRAPHIC ANALYSIS.) (ELECTRONIC EQUIPMENT, *SHOCK TUBES, OSCIL
LOGRAMS, OSCILLOSCOPES, MINIATURE ELECTRONIC EQUIPMENT, PIEZOELECTRIC GA
GES.)   -
269 722   0165   COMPILATION OF UNPUBLISHED MATERIALS INFORMATION.

269 722 NO ABSTRACT AVAILABLE

269 722   0164   (*MATERIALS, *REFRACTORY MATERI-ALS, *CERAMIC MATERIALS
, COATINGS.) (*PLAS-TICS, EXPANDED PLASTICS.) (*BEARINGS, LUBRICATION.
) (*PLASMA JETS, GAS DISCHARGES.) (FLUIDS, SEALS, SEALING COMPOUNDS.)
(*METALS, OXIDES.) (*ALLOYS, ALUMINUM ALLOYS, TITANIUM ALLOYS, NICKEL A
LLOYS, MAGNESIUM ALLOYS, MOLYBDENUM ALLOYS.) (CORROSION, FATIQUE (MECHA
NICS), FRACTURE (MECHANICS), STRESSES.)   (WELDING, WELDED JOINTS.)   -

269 734   0166   A TWO-SECTOR EXTENSION OF SWAN'S MODEL OF ECONOMIC
GROWTH   THE CASE OF NO TECHNICAL   CHANGE,

269 734   0166   THE PURPOSE OF THE PRESENT ANALYSIS IS TO EXTEND THE
SWAN ONE-SECTOR ONE-GOOD MODEL (THE ECONOMIC   RECORD, XXXII334-361,
1956) INTO A TWO-SECTOR TWO-GOOD ECONOMY FOR THE CASE OF NO TECHNICAL
CHANGE.   IN THIS CASE A SIMPLE DIAGRAMMATIC REPRESENTATION OF
COMPETITIVE GROWTH IS POSSIBLE AND THE EXPOSITION IS SIMPLE AS WELL AS
INDICATIVE OF THE PROPERTIES OF TWO SECTOR MODELS.   THE COMPOSITION OF
THE CAPITAL STOCK AND THE LABOR IS ANALYZED AND THE ALLOCATION OF THESE
FACTORS BETWEEN THE TWO SECTORS IS DETERMINED.   OUR TWO-SECTOR MODEL IS
THE NATURAL SET-UP FOR THE ANALYSIS OF THE RELATIVE PRICE OF CAPITAL
TO CONSUMER GOODS. (AUTHOR)   AD-269 73416N6

269 734   0165   (*ECONOMICS, *ECONOMIC CONDI-TIONS, COSTS, COMMERCE, MO
NEY, WAGES, PRODUCTION.)   —
269 846   0167   TUNNEL DIODE CIRCUITS AT MICROWAVE FREQUENCIES,

269 846   0167   RESULTS ARE PRESENTED OF RECENT STUDIES IN TUNNEL
DIODE MICROWAVE CIRCUITS AT THE ELECTRONIC DEFENSE LABORATORIES.
DESCRIPTIONS ARE ALSO OFFERED OF AN S-BAND LOW-NOISE AMPLIFIER WITH A
VOLTAGE GAIN BANDWIDTH PRODUCT OF 6000 MC AND OF DESIGNS OF
MECHANICALLY TUNABLE DOWN CONVERTERS.   THE PRIME FEATURES OF THE TUNNEL
DIODE, ITS SMALL SIZE AND LOW DC POWER REQUIREMENTS, ARE TAKEN
ADVANTAGE OF IN THE CIRCUIT DESIGNS.

269 846   0166   (*ELECTRONIC CIRCUITS, *DIODES, *MICROWAVE AMPLIFIERS,
MINIATURE ELECTRONIC EQUIPMENT, BROADBAND, *MICROWAVE OSCILLATORS, CRYST
AL MIXERS, FREQUENCY STABILIZERS, TRANSMISSION LINES, TUNING CIRCUITS, A
MPLI-FIERS, VERY HIGH FREQUENCY, L BAND, C BAND, S BAND, DESIGN, NOISE (
RADIO), EFFECTIVENESS, TESTS.)   —
269 865   0168   RESULTS IN GEODETIC PHOTOGRAMMETRY
III. PHOTOGRAMMETRIC DETERMINATION OF AZIMUTH OF HIRAN LINES,

269 865   0168   AN ITERATIVE SOLUTION IS DEVELOPED FOR THE
DETERMINATION OF THE AZIMUTH OF HIRAN LINES FOR PHOTOGRAMMETRIC
OBSERVATIONS OF THE LINE CROSSING   TRACE OF AN AIRBORNE FLASHING LIGHT
RECORDED AGAINST THE STELLAR BACKGROUND. RESULTS OF A TEST OF THE
METHOD ARE REPORTED AND RECOMMENDATIONS ARE MADE FOR IMPROVEMENT OF
OPERATIONAL PROCEDURES. (AUTHOR) AD-269 8659N6

269 865   0167   (*GEODESICS, GEODETIC DATA, *FLASH LAMPS, REFLECTORS, A
ZIMUTH, SIGHTS, CAMERAS.) (LEAST SQUARES METHOD, CURVE FITTING, TIME, PO
LYNOMIALS.)   —
269 864   0169   DESIGN CONSIDERATIONS OF A PHOTOSENSOR FOR THE
DETECTION OF LIGHT FLASHES,

269 864   0169   THE THEORY AND DESIGN OF A PHOTOSENSOR TO BE USED
FOR THE ACCURATE TIMING OF A MISSILE OR AIRCRAFT-BORNE STROBOSCOPIC
LIGHT ARE PRESENTED. THE PRECISE DETERMINATION OF THE FLASH TIMES OF
THE STROBE IS NECESSARY FOR CERTAIN APPLICATIONS IN GEODESY AND
TRAJECTORY DETERMINATION. CERTAIN ASPECTS OF PHOTOMETRY AND
ATMOSPHERIC PHENOMENON ARE REVIEWED TO ESTABLISH A SOLID FRAMEWORK UPON
WHICH TO BASE THE DESIGN. THE PROPERTIES OF THE STROBE LIGHT AND
BACKGROUND RADIATION ARE DISCUSSED AND A BASIC DESIGN IS DEVELOPED.

269 864   0168   (LIGHT, LIGHT TRANSMISSION.) (*OPTICAL EQUIPMENT, *PHOT
OMETERS, RADIOM-ETERS, STROBOSCOPES, FLASH LAMPS.) (DETEC-TION, *DESIGN
, THEORY, GEODESICS.) (ELECTRO-MAGNETIC WAVES, WAVE TRANSMISSION, SCATT
ERING, ABSORPTION, ATTENUATION.) (INSTRUMENTATION, OPTICAL SYSTEMS, PHO
TOMULTIPLIERS.)   —
269 875   0170   EFFECT OF ORDER-DISORDER PHENOMENA ON THE STRENGTH OF
HIGH TEMPERATURE ALLOYS.

269 875   0170   A SUMMARY RESEARCH IS PRESENTED INCLUDING (1)
DEVELOPMENT OF A PHASE DIAGRAM IN THE FE RICH REGION OF THE FE-AL
SYSTEM (2) X-RAY DIFFRACTION STUDIES OF LONG RANGE ORDER IN SOME
ALLOYS OF   FE3AL COMPOSITION (3) FEAL-FE3AL TRANSFORMATION STUDIES
(4) ELECTRON BAND THEORY APPLIED TO THE EXISTENCE OF ORDER IN FE RICH
FE-AL ALLOYS (5) GENERAL CALCULATIONS FOR ORDERING MECHANISMS AND (6)
THE EFFECT OF QUENCHING TEMPERATURE ON ROOM TEMPERATURE DEFORMATION
BEHAVIOR OF ALLOYS NEAR THE COMPOSITION FE3AL.

269 875   0169   (*HEAT RESISTANT ALLOYS, *ALU-MINUM ALLOYS, *IRON ALLOY
S, PHASE STUDIES,   PHASE TRANSITIONS, CRYSTAL STRUCTURE, X-RAY DIFFRACTI
ON ANALYSIS, HEAT TREATMENT, DEFORMA-TION, MECHANICAL PROPERTIES.)   —
269 818   0171   RESEARCH STUDY TO DETERMINE PROPULSION REQUIREMENTS
AND SYSTEMS FOR SPACE MISSIONS. VOLUME III. MISSION STUDIES.

269 818   0171   PROPULSION REQUIREMENTS AND CRITERIA, SELECTION AND
EVALUATION OF ALTERNATE PROPULSION SYSTEMS, AND SPECIFICATIONS OF
INTEGRATED CONCEPTUAL SYSTEM DESIGNS ARE REPORTED FOR EACH OF THE
SEVERAL SPACE MISSIONS SPECIFIED FOR FURTHER STUDY BY NASA AT THE
COMPLETION OF PHASE I (AD268 631 AND AD-268 362) OF THE STUDY.
PARTICULAR ATTENTION IS GIVEN TO LUNAR MISSIONS AND 24-HR SATELLITE
MISSIONS.

269 818   0170   (*SPACE PROBES, *LUNAR PROBES, *SPACE FLIGHT, SPACESHIP
S, SATELLITE VEHICLES, MANNED, BOOSTER ROCKETS, ROCKET MOTORS, CON-TROL
SYSTEMS, FLIGHT PATHS, ROCKET PROPULSION, ROCKET PROPELLANTS, STORAGE, S
PECIFIC IMPULSE, THRUST, MILITARY REQUIREMENTS, THEORY, MATHE-MATICAL AN
ALYSIS, MATHEMATICAL PREDICTION.)   —
269 816   0172   CONVECTIVE HEAT TRANSFER WITH CHEMICAL REACTION, I.
THEORETICAL DEVELOPMENT OF CORRELATION FORMULAE FOR THE PREDICTION OF
HEAT FLUXES IN HIGH PERFORMANCE ROCKET MOTORS AND RELATED SYSTEMS.

269 816   0172   ENERGY TRANSFER IN CHEMICALLY REACTING BOUNDARY
LAYER FLOWS IS DISCUSSED FROM THE POINT OF VIEW OF THE INVESTIGATOR,
WHO IS SEEKING TO EXTEND EXISTING CORRELATION FORMULAE TO CASES IN
WHICH THERMOCHEMICAL EFFECTS INFLUENCE HEAT TRANSFER RATES. EMPHASIS
IS PLACED ON THE PREDICTION OF CONVECTIVE HEAT FLUXES IN HIGH
PERFORMANCE ROCKET MOTORS HOWEVER, EXAMPLES ARE ALSO TAKEN FROM THE
FIELD OF HYPERSONIC GAS DYNAMICS, AS FOLLOWS THE APPROPRIATE DRIVING
FORCE FOR HEAT TRANSFER WITH CHEMICAL REACTION, EFFECTS OF THE ENHANCED
EFFICIENCY OF ENERGY TRANSPORT BY DIFFUSION AS COMPARED TO ORDINARY
CONDUCTION, CALCULATION OF THE TURBULENT FILM CONDUCTANCE IN
AXISYMMETRIC NOZZLES, THERMODYNAMIC CALCULATION OF
ENTHALPY/MIXTURE-RATIO CHARTS FOR COMBUSTION GAS MIXTURES, EFFECTS OF
CHEMICAL NON-EQUILIBRIUM IN THE GAS PHASE, EFFECTS OF SURFACE CATALYZED
EXOTHERMIC RECOMBINATION REACTIONS, EXTIMATION OF TRANSPORT PROPERTIES
IN PARTIALLY DISSOCIATED GAS MIXTURES WITH EMPHASIS ON THE BINARY
DIFFUSION COEFFICIENTS PERTAINING TO MOLECULAR FRAGMENTS.

269 816   0171   (*HEAT TRANSFER, *CONVECTION, BOUNDARY LAYER, GAS FLOW,
 CHEMICAL REACTIONS, THERMOCHEMISTRY, THERMODYNAMICS, ROCKET MOTORS.) (
TRANSPORT PROPERTIES, RECOMBINATION REACTIONS, BOUNDARY LAYER, GAS FLOW,
 HYPER-SONIC FLOW, HYPERSONIC NOZZLES.) (DISSOCIA-TION, COMBUSTION, HYD
ROGEN, OXYGEN, DIFFUSION.) (EXPERIMENTAL DATA, TABLES.)   —
269 813   0173   ON SEQUENTIAL LANGUAGES,

269 813   0173   NO ABSTRACT AVAILABLE

269 813   0172   (*SEQUENTIAL ANALYSIS, STATISTI-CAL ANALYSIS, PROBABILI
TY, MATHEMATICAL LOGIC.) (*LANGUAGE, PROGRAMMING, CODING, AUTOMATION, TH
EORY.)   —
269 802   0174   XM104 SUSPENSION STUDY,

269 802   0174   THE RESULTS OF A COMPARATIVE STUDY OF TWO SUSPENSION
SYSTEMS CONSIDERED FOR USE IN THE XM104 TRACKED VEHICLE ARE PRESENTED
IN COMPLETE DETAIL. SIMULATION TESTS WERE CONDUCTED OVER A MODIFIED
SINE WAVE AT SPEEDS OF 5, 10, 15, 20 AND 30 MILES PER HOUR.

269 802   0173   (*TRACKED VEHICLES, *TANKS, SUSPENSION BANDS, SPRINGS,
STABILITY, ANALYSIS, DYNAMICS, SIMULATION, TESTS.) (SHOCK WAVES, ABSORP
TION, VELOCITY, PITCH, ACCELERATION, DAMPING, MOMENT, GRAVITY.) (TEST
EQUIPMENT, ANALOG COMPUTERS, DIGITAL COMPUTERS, ANALOG TO DIGITAL CONNEC
TORS.) DIFFERENTIAL EQUATIONS.   —
269 820   0175   RELIABILITY PREDICTION AND ASSURANCE IN NAVAL
ORDNANCE WEAPONS SYSTEMS.

269 820   0175   A SUMMARY IS GIVEN CONCERNING THE DEVELOPMENT OF A
PROPOSED MILITARY STANDARD ON RELIABILITY PREDICTION FOR NAVAL WEAPONS
SYSTEMS, AND ACCOMPANYING REPORTING PROCEDURES. THE FOLLOWING 3-PHASE
PROGRAM WAS FORMULATED TO ATTAIN THE OBJECTIVE (1) PREVIOUSLY
DEVELOPED RELIABILITY PREDICTION PROCEDURES WERE APPLIED TO SELECTED
BUREAU OF NAVAL WEAPONS SYSTEMS, AND THE RESULTS WERE ASSESSED BY A
COMPARISON WITH PREVIOUSLY MEASURED RELIABILITIES. (2) THE PREDICTION
PROCEDURES USED IN PHASE 1 WERE REFINED IN ACCORDANCE WITH THE RESULTS
OBTAINED THEREFROM, AND THESE REFINED PREDICTION PROCEDURES WERE
ARRANGED IN A MILITARY STANDARD FORMAT. (3) AN EDUCATIONAL AND
INDOCTRINATIONAL PROGRAM ON THE APPLICATION OF THE PROPOSED MILITARY
STANDARD WAS PREPARED.

269 820   0174   (*RELIABILITY, MATHEMATICAL PRE-DICTION, STANDARDS, SHI
PBORNE, FIRE CONTROL, *RADAR EQUIPMENT, FIRE CONTROL COMPUTERS, AIR-BORN
E, SEARCH RADAR.) (SHIPBORNE, ELECTRONIC EQUIPMENT, FAILURE (MECHANICS)
.) NAVAL ORDNANCE.   —
269 824   0176   COCKPIT RETENTION AND PARACHUTE SUSPENSION GARMET.

269 824   0176   COCKPIT RETENTION AND PARACHUTE SUSPENSION FLIGHT
CLOTHING WHICH CAN DISTRIBUTE HIGH ACCELERATION FORCES OVER LARGE AREAS
OF THE BODY WAS STUDIED TO REDUCE INJURIES OCCURRING IN PRESENT DAY
HIGH PERFORMANCE AIRCRAFT. IT WAS FOUND THAT A FLEXIBLE, INELASTIC
NYLON-NETTING GARMET COULD BE UTILIZED IN DISTRIBUTING ACCELERATION
LOADS OVER THE BODY TORSO. BY CROSSING THE FIBERS OF A MATERIAL OVER
EACH OTHER AND BIASING THEM AT 45 DEGREES TO THE EXTERNAL LOAD, A
CHINESE FINGER GRIP CONTAINMENT ACTION CAN BE DEVELOPED. THIS
CONTAINMENT ACTION (AXIAL COMPRESSION LOAD) IS APPLIED WHEN
ACCELERATION FORCES ARE APPLIED TO THE COCKPIT SEAT OR THE RISERS.

SEVERAL RESTRAINT GARMETS WERE CONSTRUCTED FOR EVALUATION. HIP AND SHOULDER RESTRAINT STRAPS WERE INTEGRATED INTO THE NETTING PATTERN FOR ATTACHMENT TO THE RISERS AND COCKPIT SEAT. THE FINAL GARMET HAD A COVER AND LINER FOR ADDITIONAL COMFORT AND EASE OF DONNING AND DOFFING.

269 824   0175   (*FLIGHT CLOTHING, PARACHUTE FABRICS, SAFETY HARNESS, E LASTIC WEBBING, NYLON, NETS FOR LOAD DISTRIBUTION OF ACCELERA-TION, STRE SSES ON PILOTS, AVIATION PERSONNEL, AVIATION SAFETY, TESTS, DESIGN.)

269 839   0177   ON A SUCCESSIVE APPROXIMATION TECHNIQUE IN SOLVING SOME CONTROL SYSTEM OPTIMIZATION PROBLEMS,

269 839   0177   A WAY OF CONSTRUCTING MINIMIZING SEQUENCES FOR FUNCTIONALS IN OPTIMIZATION PROBLEMS HAS BEEN GIVEN AND THE PROCEDURE IS PROVED TO CONVERGE. THE PROCEDURE IS SHOWN TO BE THAT OF THE NEWTON'S METHOD IN BANACH SPACES.

269 839   0176   (*CONTROL SYSTEMS, *PROGRAMMING.) (FUNCTIONAL ANALYSIS , ALGEBRA, SEQUENCES, NONLINEAR SYSTEMS, NONLINEAR DIFFERENTIAL EQUATION S, PARTIAL DIFFERENTIAL EQUATIONS, DIFFERENTIAL EQUATIONS, EQUATIONS, FU NCTIONS.)   —
269 880   0178   RESEARCH AND INVESTIGATION ON PHOSPHOR SCREENS FOR HIGH RESOLUTION DISPLAY DEVICES.

269 880   0178   RESEARCH AND INVESTIGATION ON PHOSPHOR SCREENS TO IMPROVE THEIR INFORMATION TRANSFER CAPACITY CONTINUED. IMPROVEMENTS IN. PHOSPHOR SCREEN FORMATION BY THE ELECTRODEPOSITION TECHNIQUE WERE STUDIED. PRELIMINARY RESULTS ON THE MEASUREMENT OF THE DYNAMIC RANGE OF PHOSPHOR SCREEN PERFORMANCE ARE INDICATED.

269 880   0177   (*DISPLAY SYSTEMS, *CATHODE RAY TUBE SCREENS, *FLUORESC ENT SCREENS, *PHOSPHORS, PREPARATION, MEASUREMENT.) (ELECTRODEPOSI-TION , COATINGS, TIN COMPOUNDS, OXIDES, BISMUTH COMPOUNDS, GOLD COMPOUNDS, TI N ALLOYS, ZINC ALLOYS, GLASS.)   —
269 884   0179   APPLICATION OF WEATHER RADAR TO FALLOUT PREDICTION.

269 884   0179   SPECIAL EMPHASIS WAS PLACED ON THE OBSERVATIONAL PROGRAM, THE PRIMARY AIMS BEING TO TEST THE ABILITY OF THE 10 CM RADAR TO DETECT HAIL AND TO OBTAIN DATA SUITABLE FOR STUDYING THE VARIATIONS IN THE VERTICAL STRUCTURE OF CONVECTIVE STORMS DURING THEIR LIFETIMES. BOTH OBJECTIVES WERE ACCOMPLISHED. THE COOPERATION OF METEOROLOGISTS ASSOCIATED WITH ONE OF THE LOCAL BROADCASTING STATIONS PROVIDED HUNDREDS OF REPORTS OF HAIL OCCURRENCES. THE AGREEMENT BETWEEN THE LOCATIONS AT WHICH HAIL WAS REPORTED AND THE TRACKS OF HIGH-INTENSITY CONTOURS WAS EXCELLENT.

269 884   0178   (WEATHER FORECASTING, *METEOR-OLOGICAL RADAR, *STORMS, PRECIPITATION, HAIL, ATMOSPHERE, TURBULENCE.) (*RADIOACTIVE FALL-OUT FR OM NUCLEAR EXPLOSIONS, DISTRIBUTION BY STORMS.)   —
269 855   0180   THEORETICAL STUDY OF THE ANOMALOUS ROTATIONAL STRUCTURE OF LEVEL 0311 IN THE ROTATION-VIBRATION SPECTRUM OF C13 0162.

269 855   0180   THE ROTATIONAL PERTURBATION OBSERVED BY COURTOY IN THE LEVEL 0311 OF C130162 IS INTERPRETED AS RESULTING FROM BOTH FERMI RESONANCE AND SECOND ORDER CORIOLIS RESONANCE.

269 855   0179   (*MOLECULAR SPECTROSCOPY, CARBON, OXYGEN, ISOTOPES, MOL
ECULES, *QUANTUM MECHAN-ICS, THEORY.) (PERTURBATION THEORY, RESONANCE,
NUCLEI, MAGNETO-OPTIC ROTATION.) (OPERATORS (MATHEMATICS), MATRIX ALGE
BRA, INTEGRAL EQUA-TIONS, TRANSFORMATIONS (MATHEMATICS), NUMERICAL ANALY
SIS, PARTIAL DIFFERENTIAL EQUATIONS.)   ─
269 072   0181   AN INSTRUMENTATION SYSTEM FOR THE MEASUREMENT OF
TERRAIN PROFILE,

269 072   0181   AN INSTRUMENTATION SYSTEM FOR THE MEASUREMENT OF
TERRAIN PROFILE WAS DEVELOPED AND TESTED. ITS PURPOSE IS TO PROVIDE A
MEANS FOR THE RAPID AND ACCURATE COLLECTION OF TERRAIN-PROFILE DATA
USEFUL IN ANALYZING THE ROUGH-GROUND PERFORMANCE OF CROSS-COUNTRY
VEHICLES. THE FIELD EQUIPMENT CONSISTS OF A TWO-WHEELED MEASURING
ASSEMBLY WHICH IS TOWED ACROSS THE GROUND AT A SPEED NOT EXCEEDING 5
MPH. ELECTRICAL INSTRUMENTS MOUNTED ON THE ASSEMBLY CONTINUOUSLY
MEASURE THE SLOPE OF THE GROUND AND THE DISTANCE TRAVELED ALONG THE
SURFACE. THESE QUANTITIES ARE RECORDED ON MAGNETIC TAPE. THE MAGNETIC
TAPE IS THEN RETURNED TO A LABORATORY DATA-PROCESSING SYSTEM WHICH
OBTAINS THE PROFILE DATA BY INTEGRATING THE SLOPE OF THE GROUND WITH
RESPECT TO SURFACE TRAVEL. PRELIMINARY ANALYSIS AND TESTS INDICATE
THAT THE SYSTEM IS CAPABLE OF OBTAINING TERRAIN PROFILE WITH AN ERROR
HAVING A STANDARD DEVIATION OF NOT MORE THAN 4 INCHES IN 100 FEET.

269 072   0180   (*TERRAIN, GEOMETRY, MEASUREMENT, INSTRUMENTATION.) (V
EHICLES, MOTION, TERRAIN, DYNAMICS, ANALYSIS.) (TRACKED VEHICLES, GYROS
COPES, *ODOMETERS, ELECTRONIC EQUIPMENT, DATA PROCESSING EQUIPMENT.) (ER
RORS, ANALYSIS.) (ARMY OPERATIONS, *MILITARY TRANSPORTATION, *TERRAIN.)
    ─
269 075   0182   AN INSTRUMENTATION SYSTEM FOR MEASURING STRESSSTRAIN
RELATIONSHIPS OF SOIL,

269 075   0182   AN INSTRUMENTATION SYSTEM FOR COLLECTING AND
ANALYZING DATA ON STRESS-STRAIN RELATIONSHIPS OF THE SOIL WAS DESIGNED
AND CONSTRUCTED. THE FIELD PORTION OF THE SYSTEM CONSISTS OF A
SHEARMETER AND TWO PENETROMETERS FOR MEASURING THE EFFECTS OF
HORIZONTAL AND VERTICAL LOADING OF THE SOIL, RESPECTIVELY. THESE UNITS,
HYDRAULICALLY OPERATED, ARE MOUNTED ON THE REAR UNIT OF A POLECAT, AN
ARTICULATED TRACKED VEHICLE. TEST RUNS ARE RECORDED IN THE FIELD ON
MAGNETIC TAPE. A GENERAL-PURPOSE DATA-PROCESSING SYSTEM FOR LABORATORY
INSTALLATION HAS ALSO BEEN PROVIDED TO PERMIT MAGNETIC-TAPE PLAYBACK OF
THE TEST RUNS, AND CONVERSION TO DIGITAL FORM FOR INSERTION INTO A
DIGITAL COMPUTER.

269 075   0181   (*SOILS, PHYSICAL PROPERTIES, LOAD DISTRIBUTION, PRESSU
RE, PENETRATION, SHEAR STRESSES, DEFORMATION, MEASUREMENT, INSTRUMENTATI
ON, TRACKED VEHICLES, STRAIN GAGES, DATA PROCESSING SYSTEMS.) (*ARMY OP
ERATIONS, *MILITARY TRANSPORTATION, TERRAIN, SOILS.)   ─
269 103   0183   HOMEOSTASIS THEORY OF SMALL GROUPS. VI. VOLUNTARY
ORGANIZATIONS,

269 103   0183   SEVERAL TECHNIQUES WERE USED TO TAKE MEASUREMENTS OF
TWELVE RELATIVELY UNCONSTRAINED GROUPS (VOLUNTEER FIRE COMPANIES) WITH
REFERENCE TO GROUP NEED SATISFACTION (G.N.S.), FORMAL ACHIEVEMENT
(F.A.), ADJUSTABILITY AND SELECTED PREDICTOR VARIABLES. HOMEOSTATIC
THEORY WAS TESTED WITH REFERENCE TO THESE GROUPS. HYPOTHESIS ONE IF
G.N.S. AND F.A. ARE AT A HIGH AND APPROXIMATELY EQUALLY BALANCED LEVEL,

AN EXTERNALLY UNCONSTRAINED GROUP WILL PERSIST IN ITS EXISTENCE OVER A
PERIOD OF TIME AND BE CAPABLE OF ADJUSTING ITSELF TO CHANGES OR
DISTURBANCES IMPOSED ON IT. THE CONVERSE WAS ALSO HYPOTHESIZED.
SUPPORTING EVIDENCE FOR THIS HYPOTHESIS WAS FOUND IN THIS STUDY.
HYPOTHESIS TWO PREDICTORS OF G.N.S., F.A. AND ADJUSTABILITY
COMPENSATE AMCNG THEMSELVES TO MAINTAIN EACH OF THESE GROUP CRITERIA
WITHIN LIMITS. EVIDENCE WITH REFERENCE TO THIS HYPOTHESIS WAS MIXED.
THE RESULTS SUPPORTED THE IDEA THAT THESE VARIABLES OPERATED WITHIN
PREDEFINED LIMITS HOWEVER, THE EVIDENCE FOR THE COMPENSATORY OPERATION
OF THE PREDICTORS WAS MIXED.

269 103   0182   (*GROUP DYNAMICS, *SOCIAL COMMUNICATION, *ADJUSTMENT (
PSYCHOLOGY), SELECTION, MATHEMATICAL PREDICTION.) (BE-HAVIOR, THEORY.)

269 111   0184   LAUNCHER, ROCKET, 318 MM, XM34E1.

269 111   0184   NO ABSTRACT AVAILABLE

269 111   0183   *ROCKET LAUNCHERS, ARTILLERY ROCKETS.   -
269 135   0185   DEVELOPMENT OF RADIOGRAPHIC TECHNIQUES FOR THE
INSPECTION OF URANIUM TUBULAR SHAPES.

269 135   0185   VARIOUS RADIOGRAPHIC TECHNIQUES WERE INVESTIGATED TO
DETERMINE OPTIMUM TECHNIQUES, USING SUITABLE RADIATION SOURCES, IN
EXAMINING URANIUM TUBULAR SHAPES. ONE-MEV RESONANCE TRANSFORMER AND
TWOMEV CONSTANT POTENTIAL RADIOGRAPHIC UNITS CAN BE EMPLOYED TO YIELD 2
T RADIOGRAPHY OF THE URANIUM TUBULAR SHAPES AS WELL AS OTHER URANIUM
CONFIGURATIONS. THE DATA GENERATED SHOULD PROVE USEFUL IN PREPARING
INSPECTION REQUIREMENTS FOR END ITEM SPECIFICATIONS.

269 135   0184   (*URANIUM, URANIUM ALLOYS, NON-DESTRUCTIVE TESTING, X-R
AY PHOTOGRAPHY, *RADI-OGRAPHY, *X-RAY GENERATORS, TEST EQUIPMENT, PROCES
SING, TEST METHODS, QUALITY CONTROL.   -
269 171   0186   ACCELERATED STORAGE STABILITY TESTS,

269 171   0186   THE STORAGE LIFE OF MIL-L-7808 OILS WAS IMPROVED BY
THE USE OF AMINE TYPE ADDITIVES. THE ACCELERATED STORAGE TESTS USED TO
ARRIVE AT QUALIFICATION LIMITS ARE DESCRIBED. THE TIME-TEMPERATURE
RELATIONSHIPS FOR THE STORAGE LIFE OF MIL-L-7808 OILS ARE GIVEN. FROM
THESE RELATIONSHIPS, THE STORAGE LIFE CAN BE ESTIMATED AT ANY
TEMPERATURE FROM DATA AT ONE GIVEN TEMPERATURE.

269 171   0185   (JET ENGINES, *AIRPLANE ENGINE OILS, *OILS, *LUBRICANT
S, HYDRAULIC FLUIDS, STORAGE, DETERIORATION, WATER, ADDITIVES, AMINES,
TESTS, HIGH TEMPERATURE RESEARCH.) (LEAD, CORROSION, TEST METHODS, TEST
EQUIPMENT, OVENS.) (BUTYL RADICALS, METHYL RADICALS, AMINES, CRESYL RA
DICALS, HYDROXIDES.)   -
269 201   0187   BIBLIOGRAPHY ON VACCINIA, VIRIOLA, AND ANIMAL POX
SUPPLEMENT, 1956-1960.

269 201   0187   NO ABSTRACT AVAILABLE

269 201   0186   (*BIBLIOGRAPHY, *SMALLPOX, PATHOLOGY, IMMUNIZATION, *VI
RUS VACCINES.)   -

269 207   0188   THE DESIGN AND CONSTRUCTION OF THE ARGMA, 8,000-KW
PLASMA FACILITY.

269 207   0188   COMPLETE DESIGN CONSIDERATIONS FOR THE ARGMA
8,000-KW PLASMA FACILITY ARE REVIEWED. BOTH FACILITY REQUIREMENTS AND
PERFORMANCE CHARACTERISTICS ARE DISCUSSED FOR TYPICAL MINIMUM ENERGY
ICBM AND IRBM REENTRY TRAJECTORIES. CALCULATED STAGNATION CONDITIONS
ARE SHOWN TO BE IN THE REALM OF MODEM PLASMA ARC TECHNOLOGY.
CAPABILITY OF THE INSTALLED ELECTRIC GENERATION SYSTEM IS SHOWN TO BE
ADEQUATE TO MEET REQUIREMENTS.

269 207   0187   (DESIGN OF *TEST FACILITIES FOR *HIGH TEMPERATURE RESEA
RCH.) (HYPERSONIC WIND TUNNELS FOR PRODUCTION OF GAS DISCHARGES.) (SIMU
LATION OF SHOCK WAVES AROUND BLUNT BODIES.) (SIMULATION OF ATMOSPHERE
DURING ATMOSPHERE ENTRY OF RE-ENTRY VEHICLES.) (VACUUM SYSTEMS, DESIGN.
) PLASMA PHYSICS.   -
269 210   0189   PRODUCTION ENGINEERING MEASURE FOR RUGGEDIZED   TAUT
BAND SUSPENSION PANEL METERS PER SIGNAL   CORPS TECHNICAL REQUIREMENTS
SCS-43A.

269 210   0189   SIGNIFICANT PROGRESS WAS MADE IN OBTAINING THE
REQUIRED PERFORMANCE FOR THE 2-1/2 INCH 100 DEGREE INSTRUMENTS AFTER
SUBJECTION TO VIBRATION, TUMBLING AND SHOCK TESTS. THE PROBLEM OF
RIBBON BREAKAGE DURING TESTS WAS SOLVED FOR RIBBON SIZES SUITABLE FOR
APPLICATION IN INSTRUMENTS HAVING A FULL SCALE SENSITIVITY OF 20
MICROAMPERES. THE ELECTRICAL TEST RESULTS OF THE INSTRUMENTS
EMPHATICALLY DEMONSTRATE THE SUPERIOR PERFORMANCE OF RUGGEDIZED TAUT
BAND SUSPENSION METERS OVER CONVENTIONAL RUGGEDIZED PIVOTED METERS.
THE PROBLEM OF RIBBON BREAKAGE DURING THE HIGH SHOCK TESTS WAS ANALYZED
WITH AN ACCELEROMETER-OSCILLOSCOPE TECHNIQUE. A GOOD MEASURE OF
PROGRESS WAS ATTAINED IN SUSPENSION RIBBON FABRICATION. QUANTITIES OF
THE SMALLEST SIZE RIBBON REQUIRED FOR INSTRUMENTS ON THIS CONTRACT WERE
MADE. ENGINEERING DRAWING FOR THE 1 INCH - 180 DEGREES AND THE 2-1/2
AND 3-1/2 INCH 250 DEGREE METERS WERE COMPLETED. THE SHORT TAUT BAND
SUSPENSION RIBBONS PERMIT THE OVER-ALL DIMENSIONS TO BE PHYSICALLY
INTERCHANGEABLE WITH CONVENTIONAL PIVOTED TYPE METERS.

269 210   0188   (*METERS, DESIGN, PRODUCTION.) (*SPRINGS, SHOCK, VIBRAT
ION, TESTS.)   -
269 211   0190   SOME CHARACTERISTICS OF HORIZONTAL DIPOLE ANTENNAS AT
E. L. F.

269 211   0190   THE PERFORMANCE OF ANY ANTENNA IS DEPENDENT ON THE
ELECTRICAL PROPERTIES OF THE EARTH BENEATH IT. UNLIKE A VERTICAL
DIPOLE, THE HORIZONTAL DIPOLE ANTENNA OPERATES BEST OVER A POOR, LOW
CONDUCTIVITY MATERIAL. WHEN POSITIONED ELECTRICALLY CLOSE TO A LOSSY
MATERIAL SUCH AS THE EARTH (WHICH IT MUST BE AT VLF AND ELF), IT IS A
VERY INEFFICIENT RADIATOR. NEVERTHELESS, ITS POWER RADIATING
CAPABILITY MAY EASILY BE MADE TO EXCEED THAT ATTAINABLE FROM EXISTING
VERTICAL DIPOLES (VLF ANTENNAS) AT ELF. THIS IS TRUE BASICALLY BECAUSE
THE VERTICAL DIPOLE IS VOLTAGE LIMITED WHILE THE HORIZONTAL DIPOLE IS
CURRENT LIMITED. APPARENT CONDUCTIVITIES WERE MEASURED IN 2 LOCATIONS
- BOULDER, COLORADO, AND POLE MOUNTAIN DISTRICT OF THE MEDICINE BOW
NATIONAL FOREST, WYOMING. ANTENNA PERFORMANCES FOR ARBITRARY 10 MILE
LONG HORIZONTAL DIPOLES ARE CALCULATED FOR EACH LOCATION AT FREQUENCIES
FROM 12 TO 330 C. VERTICAL ELECTRIC FIELDS WHICH WOULD BE PRODUCED AT

DISTANCES OF 1,000, 4,000, AND 10,000 KM BY A 1 MEGAWATT TRANSMITTER
WITH A 10 MILE ANTENNA LOCATED IN THE POLE MOUNTAIN DISTRICT ARE ALSO
GIVEN. THE PRECAMBRIAN GRANITE IN THE POLE MOUNTAIN DISTRICT WAS FOUND
TO HAVE AN EFFECTIVE CONDUCTIVITY AS SEEN BY AN INCIDENT
ELECTROMAGNETIC WAVE OF APPROXIMATELY 1/100,000 MHOS/METER.

269 211   0189   (*DIPOLE ANTENNAS, *COMMUNICA-TION EQUIPMENT, ELECTRICA
L PROPERTIES, EARTH, CONDUCTIVITY, ELECTRIC FIELDS, VERY LOW FREQUENCY,
IMPEDANCE, ATTENUATION, ELECTRO-MAGNETIC WAVES, MATHEMATICAL ANALYSIS, M
EASURE-MENT, TESTS.) ANTENNAS.   -
269 212   0191   A COMPUTER-PROGRAMMED COMPONENT TOLERANCE ANALYSIS,

269 212   0191   A TECHNIQUE FOR TESTING THE OPERABILITY OF A BINARY
COUNTER DESIGN IS DESCRIBED. THE SIX INEQUALITIES EMPLOYED IN THIS
TECHNIQUE WERE DERIVED. THESE INEQUALITIES, THE OPERATING EQUATIONS,
DESCRIBED NECESSARY CONDITIONS FOR THE TRANSISTORS TO BE IN THE ON AND
OFF STATES AND THE NECESSARY CONDITIONS FOR SWITCHING EITHER TRANSISTOR
FROM THE ON TO THE OFF STATE. THE OPERATING EQUATIONS FORMED THE BASIS
FOR A COMPUTER PROGRAM WHICH WAS WRITTEN IN A MANNER SUCH THAT THE IBM
704 COULD PREDICT THE PROBABILITY THAT A BINARY COUNTER EMPLOYING,
FIRST +50PERCENT TOLERANCES PASSIVE COMPONENTS AND SECOND, OPERATE
NORMALLY. THE RESULTS INDICATE THAT +50PERCENT TOLERANCE COMPONENTS
AFFORD A PROBABILITY OF NORMAL CIRCUIT OPERATION EQUAL TO 0.919,
COMPARED WITH 1.0 PROBABILITY FOR 20-PERCENT TOLERANCE COMPONENTS.

269 212   0190   (*RELIABILITY, *DIGITAL COM-PUTERS, PROGRAMMING, ELECTR
ONIC CIRCUITS.) (SEMICONDUCTORS, TRIGGER CIRCUITS.)   -
269 214   0192   ON THE COMPENSATION OF THE INFLUENCE OF DELAYS IN
MULTIVARIABLE DISCRETE AUTOMATIC CONTROL SYSTEMS,

269 214   0192   A GENERAL METHOD FOR THE COMPENSATION OF THE
INFLUENCE OF DELAYS IN MULTIVARIABLE LINEAR DISCRETE AUTOMATIC CONTROL
SYSTEMS IS PRESENTED. AS A RESULT OF THE SYNTHESIS BASED ON THE
PRESENTED METHOD, A COMPENSATED SYSTEM IS OBTAINED. THE RESULTING
CLOSED-LOOP DYNAMICS OF THE COMPENSATED SYSTEM IS IDENTICAL WITH THE
CLOSED-LOOP DYNAMICS OF THE SYSTEM WITHOUT DELAYS, AND ONLY THE
BEHAVIOR OF THE OUTPUT SIGNAL OF CLOSED-LOOP COMPENSATED SYSTEM IS
AFFECTED BY THE OCCURRING DELAYS. CERTAIN PROPERTIES OF MULTIVARIABLE
SYSTEMS, WHICH DISTINGUISH THE PROBLEM FROM THE ANALOGOUS ONE IN A
SINGLE-VARIABLE CASE, ARE EMPHASIZED. SOME ADVANTAGES FOR THE
COMPENSATION OF THE INFLUENCE OF DELAYS IN DISCRETE SYSTEMS IN
COMPARISON TO THE SAME IN CONTINUOUS SYSTEMS ARE DISCUSSED. IN THE
CONCLUSION SOME PROSPECTS OF THE METHOD AND A POSSIBLE DIRECTION OF
FURTHER INVESTIGATION ARE GIVEN.

269 214   0191   (*CONTROL SYSTEMS, AUTOMATIC, TIME DELAY RELAYS, *LINE
AR SYSTEMS, THEORY, MATHEMATICAL ANALYSIS, INTEGRAL TRANSFORMS.) (DATA P
ROCESSING SYSTEMS, DIGITAL SYSTEMS.)   -
269 216   0193   HIGH TEMPERATURE DIELECTRIC MATERIALS.

269 216   0193   TECHNIQUES WERE DEVELOPED AND ADAPTED TO PREPARE
REFRACTORY OXIDES, PARTICULARLY SINGLE CRYSTALS, FOR DIELECTRIC
ANALYSES. IN PARTICULAR, METHODS OF SPUTTERING AND EVAPORATION WERE
EXTENDED TO PROVIDE HEAVY NOBLE METAL ELECTRODES. THE DC RESISTIVITY
AT ELEVATED TEMPERATURES OF MGO) SINGLE CRYSTALS WAS INCREASED BY THE
APPLICATION OF DC FIELDS AT TEMPERATURES FROM 25 TO 560 C   THE SAME

WAS TRUE FOR THE AC RESISTIVITY. THE EFFECT OF EXPOSURE TO HIGH
TEMPERATURES ALONE GENERALLY LOWERED THE RESISTIVITY. THIN FILMS OF
AL2O3 FORMED ANODICALLY AND HEAT TREATED, HAD GOOD DIELECTRIC
PROPERTIES AT MODERATE TEMPERATURES. TIO2 FILMS PREPARED BY THE
PYROLYSIS OF TICL4 WERE EXCELLENT DIELECTRICS.

269 216   0192   (*DIELECTRICS, *REFRACTORY MATERIALS, CERAMIC MATERIALS
, CAPACITORS, PREPARATION, SINGLE CRYSTALS, *CERMETS, *THIN FILMS, IMPUR
ITIES.) (MAGNESIUM COMPOUNDS, ALUMINUM COMPOUNDS, TITANIUM COMPOUNDS, S
TRONTIUM COMPOUNDS, BARIUM COMPOUNDS, OXIDES.) (PROCESSING, PYROLYSIS,
 ELECTRO-DEPOSITION, EVAPORATION.) (HIGH TEMPERATURE RESEARCH, DIELECTR
IC PROPERTIES.)   -
269 218   0194   SPACE BACKGROUND STUDY.

269 218   0194   A SUMMARY REPORT IS PRESENTED OF A TWO-YEAR EFFORT
TO OBTAIN AND PRESENT ASTRONOMICAL DATA DESIGNED TO SHOW THE NATURE AND
EXTENT OF THE INFRARED SPACE BACKGROUND. EMPHASIS IN THE FIRST PHASE
WAS PLACED ON HISTORICAL AND THEORETICAL CONSIDERATIONS OF THE
PROBLEM. A SUMMARY TABLE OF THE COMPUTED INFRARED MAGNITUDES OF 235
STARS IN THREE INFRARED WAVEBANDS IS PRESENTED, BASED ON THE ASSUMPTION
THAT STARS RADIATE AS BLACKBODIES OVER THEIR ENTIRE SPECTRAL RANGE.
THE SECOND PHASE WAS DESIGNED TO TEST THE FOREGOING ASSUMPTION BY
OBSERVING AND MEASURING, IN THE INFRARED, A NUMBER OF SELECTED
ASTRONOMICAL SOURCES. TO THIS END, TWO INFRARED PHOTOMETER SYSTEMS ERE
DESIGNED, CONSTRUCTED AND EMPLOYED ON THE PERKINS AND MOUNT WILSON
OBSERVATORIES' TELESCOPES. THE RESULTS OF THE OBSERVATIONS MADE WITH
THESE PHOTOMETERS FROM OCTOBER, 1960 TO SEPTEMBER, 1961, ARE
PRESENTED.

269 218   0193   (*ANTIAIRCRAFT DEFENSE SYSTEMS, OPTICAL SYSTEMS, *INFRA
RED OPTICAL SYSTEMS, DESIGN, *AERIAL TARGETS, DETECTION, *ASTRONOM-ICAL
DATA, *INFRARED RADIATION, *STAR MODELS, BLACKBODY RADIATION, THEORY, LI
TERATURE.) (*INFRARED RADIATION, MEASUREMENT, INSTRU-MENTATION, *INFRARE
D OPTICAL SYSTEMS, *PHO-TOMETERS, DESIGN, CONSTRUCTION, TELESCOPES.)
-
269 219   0195   INVESTIGATION OF ANTENNA BEAM SCANNING.

269 219   0195   A THEORETICAL STUDY OF THE ANTENNA CONFIGURATION WAS
MADE TO DETERMINE (1) DESIGN DATA FOR THE WULLENWEBER ARRAY, AND (2)
DESIGN OF A COMMUTATOR SUITABLE FOR GENERATING THE PROPER DRIVING
DISTRIBUTION. FAR FIELD CONTOUR PATTERNS WERE CALCULATED FOR THE FEED
RING RADII OF 10, 20, 40, AND 60 LAMBDA AND FOCAL LENGTHS OF 5 AND 7.5
LAMBDA. PATTERNS WERE ALSO CALCULATED FOR THE FEED RING POSITIONED OFF
FOCUS BY 1, 2, AND 3 BEAMWIDTHS TO DETERMINE HIGHER ANGLE COVERAGE
CAPABILITIES. COMMUTATOR WORK CONSISTED MAINLY OF THE REDESIGN OF A
PREVIOUSLY BUILT COMMUTATOR.

269 219   0194   (*RADAR ANTENNAS, ANTENNAS, *ELECTRONIC COMMUTATORS, CO
MMUTATORS, REFLEC-TORS, ANTENNA HORNS, TRANSMISSION LINES, FOCUSING, DES
IGN.) (*ANTENNA RADIATION PATTERNS, LOBING, PHASE MEASUREMENT, MATHE-M
ATICAL ANALYSIS, MEASUREMENT.)   -
269 221   0196   INVESTIGATION OF THE EFFECTS OF MAGNETIC FLUX ON
DISLOCATION MOVEMENT AND ALIGNMENT.

269 221   0196   OBSERVATIONS HAVE LED TO THE HYPOTHESIS THAT   UNDER
SOME CONDITIONS, MAGNETIC FLUX INFLUENCES THE MOVEMENT OF DISLOCATIONS
WITHIN THE GRAINS   OF A FERROMAGNETIC MATERIAL. BASED ON X-RAY
DIFFRACTION EXTINCTION CONTRAST, A TECHNIQUE WAS DERIVED FROM THE WORK
ON THIS PROJECT THAT MAKES IT POSSIBLE TO MAKE A DIRECT OBSERVATION OF
DISLOCATIONS IN NICKEL FOIL SAMPLES   THE DISLOCATION MOVEMENTS CAN
THEREBY BE FOLLOWED WHEN THE SAMPLES ARE SUBJECTED TO MAGNETIC FLUX.
AN UNMISTAKABLE CHANGE IN THE IMPERFECTION STRUCTURE WAS OBSERVED. IT
IS RECOMMENDED THAT THIS OBSERVATION BE FOLLOWED BY A MORE COMPLETE
INVESTIGATION OF THE NATURE OF THE CHANGE AND THE MANNER IN WHICH IT IS
INFLUENCED BY MAGNETIC FLUX.

269 221   0195   (*GRAINS (METALLURGY), DEFORMA-TION, STRESSES, FERROMAG
NETIC MATERIALS,   CRYSTAL STRUCTURE, MAGNETIC EFFECTS, NICKEL.) (X RAYS,
 REFLECTION, *X-RAY DIFFRACTION   ANALYSIS, PHOTOGRAPHIC ANALYSIS, X-RAY
DIFFRAC-TION CAMERAS.)   -
269 222   0197   AN EXAMPLE OF CHROMOSPHERIC STRIATION OBSCURATION BY
A GREAT FLARE,

269 222   0197   CERTAIN GREAT SOLAR FLARES PRODUCE A TEMPORARY
OBSCURATION OR DISRUPTION OF THE NEIGHBORING CHROMOSPHERIC STRIATION
PATTERNS. THESE PATTERNS ARE BASICALLY HYDRODYNAMIC PHENOMENA, BUT ARE
CLOSELY LINKED TO THE LOCAL MAGNETIC FIELD.   HENCE THEIR BEHAVIOUR IS
IMPORTANT TO AN UNDERSTANDING OF THE PHYSICAL PROCESSES IN FLARES.
SEVENTEEN GREAT FLARES ON SACRAMENTO PEAK FILMS WERE EXAMINED FOR THIS
EFFECT. ONE OUTSTANDING EXAMPLE WAS FOUND ON 6 MAY 1960   THIS CASE IS
DESCRIBED IN DETAIL. EVIDENCE CLEARLY SHOWS THAT THE EFFECT RESULTS
FROM LOCAL OBSCURATION BY FLARE SURGE MATERIAL IN THE CORONA   IT IS
NOT NECESSARY TO INVOKE ANY CATASTROPHIC CHANGE IN THE MAGNETIC FIELD.

269 222   0196   (*SOLAR ATMOSPHERE, SOLAR DISTURBANCES, INTERFERENCE, *
SOLAR FLARES, VORTICES, MAGNETIC FIELDS.)   -
269 223   0198   XM143E1 WARHEAD SECTION SHIPPING AND STORAGE
CONTAINER STUDY.

269 223   0198   WORK IS REPORTED ON THE REDESIGN OF THE XM143 ATOMIC
WARHEAD CASE. THE NEW UNIT WAS DESIGNATED THE XM143E1 CONTAINER. THE
DESIGN OF THE CONTAINER WAS REFINED TO REDUCE BOTH WEIGHT AND COST,
WHILE KEEPING THE CONTAINER'S UNIVERSALITY. THE CASE WAS DESIGNED TO
UTILIZE STANDARD MANUFACTURING TECHNIQUES. DESIGN OF THE SUSPENSION
FRAME WAS REQUIRED TO MAINTAIN FUNCTION AND SUPPORT LOCATION AND TO
IMPROVE LOADING ACTION. STACKING BRACKETS, SHOCK MOUNTS, AND LATCHES
WERE REDESIGNED. THE DESIGN OF THE OVER-ALL CONTAINER WAS REFINED TO
INSURE MAXIMUM USAGE OF THE MOST ECONOMICAL STANDARD HARDWARE AND
MATERIALS AVAILABLE.

269 223   0197   (GUIDED MISSILE WARHEADS, *NU-CLEAR WARHEADS, *CONTAINE
RS, STORAGE, SHIPPING, HANDLING, MOUNTING BRACKETS, VIBRATION ISO-LATORS
, EFFECTIVENESS, COSTS, DESIGN.)   -

269 224   0199   DEVELOPMENT OF A HIGH-TEMPERATURE,
NUCLEARRADIATION-RESISTANT PNEUMATIC POWER SYSTEM FOR FLIGHT VEHICLES.

269 224   0199   THE DEVELOPMENT STATUS OF THE ROTARY ACTUATOR AND
SERVO VALVE, PRESSURE REGULATOR, RELIEF VALVE, ACCUMULATOR, FILTER AND
CHECK VALVE AS WELL AS THE TURBO-COMPRESSOR ARE DISCUSSED. PROGRESS
WAS MADE ON REFINING THE TEST PROGRAM FOR THE TUBE FITTINGS AND BOSS
SEALS. A HIGHTEMPERATURE FACILITIES SURVEY WAS UNDERTAKEN TO EVALUATE
INSTRUMENTATION, PROCEDURES, AND SAFETY REGULATIONS USED BY OTHER
COMPANIES CONCERNED WITH HIGH-TEMPERATURE AND NUCLEAR RADIATION
TESTING. RESULTS OF THIS SURVEY ARE ALSO INCLUDED.   INITIAL
PREPARATIONS WERE UNDERTAKEN TO PREPARE THE HIGH TEMPERATURE TEST
LABORATORY FOR THE TEST PHASE. MODIFICATION OF THE ENVIRONMENTAL
CHAMBER AND AIR HEATER ARE UNDERWAY. INSTRUMENTATION REQUIREMENTS WERE
REVIEWED AND PRELIMINARY PROCUREMENT WAS INITIATED ON LONG LEAD TIME
TEST EQUIPMENT.

269 224   0198   (*PNEUMATIC SYSTEMS, RESISTANCE, TEMPERATURE, THERMAL R
ADIATION, HIGH TEMPERA-TURE RESEARCH, RADIATION DAMAGE, RADIATION EF-FEC
TS.) (AIRCRAFT EQUIPMENT, TURBO-RAMJETS, COMPRESSORS, ROTARY COMPRESSORS
, HIGH PRESSURE COMPRESSORS, COMPRESSED AIR, PNEUMATIC SYSTEMS, CONTRO
L SYSTEMS, HYDRAULIC POWER SYSTEMS, DESIGN.) (*P NEUMATIC DEVICES, PNE
UMATIC VALVES, PNEUMATIC SERVOMECHANISMS, HIGH PRESSURE VALVES, CHECK V
ALVES, PRESSURE REGULATORS, CONTROL VALVES.)   −
269 226   0200   STRUCTURE OF VITREOUS AND LIQUID BORON TRIOXIDE AND
SOME SIMPLE BORATES.

269 226   0200   RESEARCH WAS CONDUCTED TO OBTAIN STRUCTURAL
INFORMATION ON THE VITREOUS AND LIQUID B2O3 AND BINARY BORATES. BY
THE USE OF HIGH-PRESSURE TECHNIQUES, SIMPLE CRYSTALS OF TWO FORMS OF
B2O3 WERE PREPARED FOR X-RAY DIFFRACTION STUDIES. THE TENTATIVE PHASE
DIAGRAM FOR LIQUID AND CRYSTALLINE B2O3 WAS CONSTRUCTED UP TO 1100 C
AND 90,000 ATMOSPHERES. THE EFFECTS OF WATER ON THE VISCOSITY,
ELECTRIC CONDUCTANCE, AND DENSITY OF LIQUID B2O3 WERE EXAMINED
INDICATING THAT SOME OF THE CURRENT HYPOTHESES CONCERNING THE STRUCTURE
OF LIQUID B2O3 CAN BE REJECTED. PRELIMINARY RESULTS ON THE IR
ABSORPTION OF SOLID AND LIQUID B2O3 WERE OBTAINED. OTHER WORK IN
PROGRESS INCLUDES NUCLEAR MAGNETIC RESONANCE ABSORPTION, VISCOSITY
MEASUREMENTS OF BINARY BORATES AT TEMPERATURES BELOW THE LIQUIDUS, AND
SINGLE-CRYSTAL DIFFRACTION ON ALPHA-AND BETA-B2O3.

269 226   0199   (*BORON COMPOUNDS, *OXIDES, CRYS-TALS, SINGLE CRYSTALS,
 PREPARATION, LIQUIDS, *GLASS, PHASE STUDIES, PHASE TRANSITIONS, CRYS-T
AL STRUCTURE.) (LIQUIDS, VISCOSITY, ELECTRI-CAL PROPERTIES, CONDUCTIVIT
Y, DENSITY, WATER.) (*BORATES, SODIUM COMPOUNDS, VISCOSITY.) (HIGH TEMP
ERATURE RESEARCH, HIGH PRESSURE RESEARCH, INFRARED SPECTROSCOPY, NUCLEAR
 MAGNETIC RESONANCE.)   −
269 227   0201   RESEARCH ON LOW TEMPERATURE FUEL CELL SYSTEMS.

269 227   0201   FUEL ELECTRODE STUDIES RESULTED IN THE FOLLOWING
DEVELOPMENT OF TWO ELECTRODE STRUCTURES FOR CARRYING OUT FUEL AND
ELECTROCATALYST INVESTIGATIONS IN MATRIX-TYPE FUEL CELLS, AND CELL
STRUCTURES INCLUDING ONE WITH REFERENCE ELECTRODES   A SURVEY OF
CHEMICAL ELEMENTS FOR ELECTROCATALYTIC ACTIVITY WITH H, HYDROCARBONS,
AND OTHER FUELS, C BASE ELECTROCATALYSTS FOR ACTIVITY WITH H,
HYDROCARBONS, AND O, AND A NUMBER OF MECHANICAL MIXTURES AND COMPOUNDS
AND A FEW ALLOYS FOR ELECTROCATALYTIC ACTIVITY IN FUEL CELLS

IDENTIFICATION OF PT AS THE MOST ACTIVE SIMPLE CATALYST FOR ANODIC
OXIDATION OF HYDROCARBONS IN FUEL CELLS   DISCOVERY THAT SATURATED
HYDROCARBONS ARE MORE RAPIDLY OXIDIZED IN ACIDIC ELECTROLYTE CELLS AS
COMPARED WITH BASIC ELECTROLYTE CELLS AND THAT WITH OLEFINS THE
ELECTROLYTE EFFECT IS SMALLER AND IN FAVOR OF THE BASIC ELECTROLYTE
AND IDENTIFICATION OF STRONG EFFECTS OF ELECTROLYTE UPON ADSORPTION
RATES OF HYDROCARBON FUELS WHICH CORRELATES WITH THE OBSERVATIONS OF
THE PRECEDING ITEM.

269 227   0200   (*FUEL CELLS, LIQUIDS, HYDRO-CARBONS, OXIDATION-REDUCTI
ON REACTIONS, LOW TEMPERATURE RESEARCH, GASES.) (ELECTRODES, ELECTROLYT
IC CELLS, STRUCTURES, CATALYSIS.) (CATALYSTS, PLATINUM, METALS.) (ELECT
ROLYTES, ACIDS, HYDROXIDES.) (CHEMICAL REACTIONS, AD-SORPTION, VOLUMET
RIC ANALYSIS, ANODES (ELEC-TROLYTIC CELL).)   -
269 059   0204   ENGINEERING FOR PRODUCTION OF CARTRIDGE, 20MM, HPT,
M54E2,

269 059   0204   FEEDING AND RAMMING DIFFICULTIES DURING SHORT BURST
AUTOMATIC FIRE WITH THE CARTRIDGE, 20MM, HPT, M54 WERE TRACED TO THE
EXTERNAL CONFIGURATION OF THE PROJECTILE NOSE, A REDESIGN BEING
INDICATED. THE T46 AND T51 PROJECTILES WERE DEVELOPED WHICH PROVED TO
BE SATISFACTORY IN LIMITED TESTS. THE T46 CLOSELY FOLLOWED STANDARD
(M55) PROJECTILE DESIGN, BUT THE T51 WAS COMPLETELY UNCONVENTIONAL,
BEING OF ONE-PIECE CONSTRUCTION AND HAVING A DISTINCTIVE DUMBBELL
SHAPE. A COST STUDY INDICATED THE T51 DESIGN TO BE THE MORE ECONOMICAL
TO MANUFACTURE AND ITS UNUSUAL SHAPE MADE IT INHERENTLY IDENTIFIABLE.
THE ONE-PIECE CONSTRUCTION ALSO ELIMINATED NOSE ASSEMBLY DIFFICULTIES
AND SECURITY PROBLEMS DURING FEEDING AND RAMMING. MINOR DESIGN AND
DIMENSIONAL CHANGES WERE MADE TO THE T51 PROJECTILE TO PROMOTE VOLUME
PRODUCTION, AND IT WAS DESIGNATED THE M54E2. IT IS RECOMMENDED THAT
THE CARTRIDGE, 20MM, HPT, M54E2 BE STANDARDIZED AS THE CARTRIDGE, 20MM,
HPT, M54A1 FOR PROCUREMENT WHERE HIGH PRESSURE TEST AMMUNITION IS
REQUIRED FOR USE IN 20MM AIRCRAFT WEAPONS.

269 059   0201   (*AIRCRAFT AMMUNITION, DESIGN, TESTS, COSTS.) (AMMUNIT
ION, PRESSURE, TESTS, GUN BARRELS, GUNS, AIRCRAFT GUNS, AUTOMATIC WEAPON
S.)   -
269 099   0205   PHENYLPHOSPHONIC DIISOCYANATE AND SOME OF ITS
REACTION PRODUCTS,

269 099   0205   PURE PHENYLPHOSPHONIC DIISOCYANATE (I) AND
PHENYLPHOSPHINYLIDENEBIS(3-PHENYLUREA) (VI) WERE PREPARED AND
IDENTIFIED THEIR THERMAL STABILITIES WERE STUDIED. ATTEMPTS WERE MADE
TO OBTAIN THERMALLY STABLE POLYMERS BY THE ADDITION COPOLYMERIZATION OF
I WITH 3,6-DIAMINOTETRAZINE, BENZOGUANAMINE, O-, M- AND
P-PHENYLENEDIAMINE, SULFAMIDE, 1,3-DIMETHYL- AND
1,3-DIPHENYLSULFAMIDE. THE POLYMERIZATION PRODUCT WITH
PPHENYLENEDIAMINE APPEARED TO BE A MIXTURE (70$ OF COPOLYMER OR OF
PHENYLPHOSPHINYLIDENEBIS(3P-AMINOPHENYLUREA) OR
PHENYLPHOSPHINYLIDENE3,3'-P-PHENYLENEDIUREA WITH 30$ OF HOMOPOLYMERIC
PHENYLPHOSPHONIC DIISOCYANATE) QUITE STABLE AT 250 C(9.4$ WT LOSS).
THE PRODUCT WITH M-PHENYLENEDIAMINE WAS CONSIDERED AS A MIXTURE OF 80$
OF COPOLYMER OR PHENYLPHOSPHINYLIDENEBIS(3-M-AMINOPHENYLUREA) OR
PHENYLPHOSPHINYLIDENE3,3'-M-PHENYLENEDIUREA AND 20$ OF HOMOPOLYMER.

269 099   0202   (*PHOSPHORUS COMPOUNDS, PHENYL RADICALS, *PHOSPHONYL RA
DICALS, *CYANATES AND PHOSPHINES, UREA, SYNTHESIS, TEMPERATURE, STABILIT
Y, PYROLYSIS, INFRARED SPECTROSCOPY.) (CATALYSTS, ETHYL RADICALS, AMINES
.) (*POLY-MERS, POLYMERIZATION, COPOLYMERIZATION WITH AMINES, PYRIDINES
 OR BENZOYL RADICALS, GUANI-DINES OR METHYL RADICALS, PHENYL RADICALS, S
ULFAMYL RADICALS, AMINES, HETEROCYCLIC COM-POUNDS.) CHEMICAL REACTIONS.

269 126   0206   STUDY OF CRATER PHYSICS.

269 126   0206   THE WORK PERFORMED ON THE CALIBRATION AND STUDY OF
VARIOUS METEORITE DETECTORS IS REVIEWED. DYNAMIC MEASUREMENTS ARE
REPORTED FOR DETECTORS DESIGNED TO UTILIZE IMPACT FLASH, IMPACT
IONIZATION, AND MOMENTUM TRANSFER EFFECTS MICROPHONE DETECTORS USED TO
STUDY THE PRODUCTION OF A SIGNAL PARTICLE IMPACT ARE ALSO REVIEWED.

269 126   0203   (*METEORITES, *CRATERING, DYNAM-ICS, DETECTION, MEASURE
MENT, THEORY, TESTS.) (DETECTORS, ACOUSTIC DETECTORS, THIN FILMS.) (PART
ICLES, IONIZATION, ENERGY, VELOCITY.) (TEST METHODS, TEST EQUIPMENT.)

269 102   0207   SIMULATION STUDIES ON THE ELECTROMAGNETIC PROPERTIES
OF THE WAKE OF A RE-ENTRY BODY.

269 102   0207   THE INITIAL PHASES OF AN EXPERIMENTAL PROGRAM ON THE
LABORATORY SIMULATION OF THE ELECTROMAGNETIC PROPERTIES OF THE WAKE OF
A RE-ENTRY BODY ARE DESCRIBED. THE SCALING CONSIDERATIONS INVOLVED IN
THE COMPARISON OF THE LABORATORY AND FULLSCALE SYSTEMS ARE DISCUSSED,
AND THE FLOW SYSTEM WHICH WAS DEVELOPED IS DESCRIBED. THE RESULTS OF
SEVERAL PLASMA DIAGNOSTIC METHODS ARE PRESENTED. THESE INCLUDE A FLOW
VISUALIZATION TECHNIQUE, HIGH SPEED MICROWAVE TRANSMISSION AND
REFLECTION MEASUREMENTS ON SUPERSONIC PLASMA FLOW STREAMS, AND FLOATING
DOUBLE PROBE MEASUREMENTS IN NONSTATIONARY PLASMAS. MANY INTERESTING
PHENOMENA WHICH WERE OBSERVED, INCLUDING TURBULENCE IN THE PLASMA
STREAM, ARE DESCRIBED.

269 102   0204   (*ANTIAIRCRAFT DEFENSE SYSTEMS, *AERIAL TARGETS, GUIDED
 MISSILES, DETECTION.) (SIMULATION, *ELECTROMAGNETIC PROPERTIES, WAKE,
CONDENSATION TRAILS, *RE-ENTRY VEHICLES, RE-ENTRY AERODYNAMICS.) (EXPER
IMENTAL DATA, *PLASMA PHYSICS, *ELECTROMAGNETIC WAVES, *SU-PERSONIC FLOW
, MEASUREMENT, MICROWAVE PROBES, WAVE TRANSMISSION, REFLECTION, TURBULEN
CE.)
269 130   0208   DEVELOPMENT OF NIOBIUM-BASE ALLOYS.

269 130   0208   THE EFFECT OF O AND N ADDITIONS ON THE HARDNESS,
WORKABILITY, STRAIN-HARDENING CHARACTERISTICS, AND RECRYSTALLIZATION
BEHAVIOR OF NB WAS DETERMINED. N ADDITIONS WERE DETRIMENTAL TO COLD
ROLLING CHARACTERISTICS. HARDNESS, WORKABILITY, AND MECHANICAL
PROPERTY DATA FOR NB-C ALLOYS WERE OBTAINED. GRAIN BOUNDARY CARBIDES
WERE DETRIMENTAL TO COLD WORKABILITY. CARBON ADDITIONS INCREASED THE
DUCTILE-BRITTLE TRANSITION TEMPERATURE RANGE OF NB. MECHANICAL
PROPERTY DATA WERE OBTAINED FOR MANY BINARY, TERNARY AND QUATERNARY NB
BASE ALLOYS. RE, W, AND MO ADDITIONS INCREASED THE DUCTILE BRITTLE
TRANSITION OF NB. A NUMBER OF ALLOYS WERE PREPARED BY THE CONSUMABLE
ELECTRODE ARC MELTING PROCESS. INGOT BREAKDOWN WAS ACCOMPLISHED BY
HIGH ENERGY RATE EXTRUSION (DYNAPAK). THE RESULTS OF DYNAPAK EXTRUSION

WERE VERY ENCOURAGING. SEVERAL HIGH STRENGTH ALLOYS WERE
INVESTIGATED. ONE ALLOY, NB-10W-5V-1ZR, HAD EXCELLENT ROOM
TEMPERATURE DUCTILITY AND ULTIMATE TENSILE STRENGTHS OF 64,800 PSI AND
29, 450 PSI AT 1205 AND 1315 C RESPECTIVELY.

269 130   0205   (*NIOBIUM ALLOYS, *NIOBIUM, MECHANICAL PROPERTIES.) (N
IOBIUM, ADDITIVES, OXYGEN, NITROGEN, CARBON.) (NIOBIUM ALLOYS, PREPARAT
ION, PROCESSING, EXTRUSION, MELTING, WELDING.) REFRACTORY MATERIALS.

269 014   0209   EFFECTS OF OUTER-SPACE ENVIRONMENT IMPORTANT TO
SIMULATION OF SPACE VEHICLES.

269 014   0209   THE RESULTS OF A LITERATURE SURVEY TO DEFINE THE
EFFECTS OF THE OUTER-SPACE ENVIRONMENT IMPORTANT TO THE SIMULATION OF
SPACE VEHICLES ARE PRESENTED. THE DISCUSSION IS GENERAL, HAVING NOT
BEEN CONSTRAINED BY THE INCLUSION OF SPECIFIC VEHICLES OR
TRAJECTORIES. ONLY THE NATURAL ENVIRONMENT OF SPACE IS CONSIDERED AND
THE SURVEY IS LIMITED TO THE SOLAR SYSTEM WITH PARTICULAR EMPHASIS ON
THE REGION IN THE NEAR VICINITY OF THE EARTH-MOON SYSTEM AND AT HEIGHTS
GREATER THAN 80 KILOMETER ABOVE THE EARTH'S SURFACE. TO SPECIFY THOSE
EFFECTS THAT NEED TO BE INCORPORATED INTO A SPACE TRAINING SIMULATOR,
THE EXTERIOR ENVIRONMENT, ITS EFFECTS ON THE VEHICLE AND CREW, AND THE
MALFUNCTIONS THAT MAY RESULT MUST BE DETERMINED. THESE SUBJECTS ARE
TREATED, ALONG WITH A CONSIDERATION OF THE ADEQUACY OF THE EXISTING
DATA IN THE STUDY. RECOMMENDATIONS FOR FURTHER STUDY ARE PRESENTED.

269 014   0206   (*SPACE ENVIRONMENTAL CONDITIONS, SPACESHIPS, SPACESHIP
 CABINS, DESIGN, SIMULA-TION OF SPACE FLIGHT, FLIGHT SIMULATORS FOR TRAI
NING DEVICES.) (RADIATION HAZARDS, ELEC-TROMAGNETIC EFFECTS, RADIATION
EFFECTS, SOLAR ENERGY, PARTICLES, COSMIC RAYS, X RAYS, GAMMA RAYS, IONS,
 PHOTONS.) (HAZARDS FROM METEORS, METEORITES, INTERSTELLAR MATTER, UPPE
R ATMOS-PHERE, ELECTROMAGNETIC FIELDS, ELECTROSTATIC FIELDS, GRAVITY.)

269 000   0210   PRELIMINARY OBSERVATIONS ON THE EFFUSION COOLING OF
CATALYTIC SOLIDS EXPOSED TO PARTIALLY DISSOCIATED NONEQUILIBRIUM GAS
STREAMS,

269 000   0210   THE CONSEQUENCES OF GAS PHASE CHEMICAL REACTION
BETWEEN AN EFFUSION COOLANT AND CHEMICALLY REACTIVE SPECIES PRESENT IN
THE FREE STREAM ARE DISCUSSED WITH REGARD TO CONVECTIVE ENERGY TRANSFER
TO CATALYTICALLY ACTIVE SOLIDS. A POROUS CU SURFACE WAS EXPOSED TO A
SUPERSONIC STREAM OF ACTIVATED N. THE RELATIVE EFFECTIVENESS OF
ETHYLENE, NH3, N, AND NO2 AS COOLANTS WAS MARKEDLY ALTERED BY THE
EFFECTS OF SPECIFICITY IN THEIR GAS PHASE CHEMICAL BEHAVIOR. THIS
SUGGESTED THAT DIFFERENCES IN GAS PHASE CHEMICAL REACTIVITY COULD BE
USED IN SELECTING EFFUSION COOLANTS FOR CATALYTICALLY ACTIVE SOLIDS
EXPOSED TO HIGH TEMPERATURE PARTIALLY DISSOCIATED STREAMS.

269 000   0207   (*SOLIDS, CATALYSTS, *FILM COOLING, *GASES, PRESSURE, T
URBULENT BOUNDARY LAYER, THERMAL DIFFUSION, TRANSPORT PROPERTIES, HEAT O
F FORMATION, CHEMICAL REACTIONS, REAC-TION KINETICS, THERMOCHEMISTRY.)
(COOLANTS, NITROGEN, ETHYLENES, AMMONIA, NITROGEN COM-POUNDS, OXIDES.)
ELECTRIC DISCHARGES.   -

269 001   0211   A STUDY TO CORRELATE FLIGHT MEASURED HELICOPTER VIBRATION DATA AND PILOT COMMENTS.

269 001   0211   THE RESULTS OF A STUDY AIMED AT IMPROVING THE CORRELATION BETWEEN RECORDED HELICOPTER VIBRATION DATA AND PILOT COMMENTS ARE PRESENTED. LISSAJOUS' PATTERNS OF RESULTANT DISPLACEMENT, VELOCITY, AND ACCELERATION ARE CONSTRUCTED AND EVALUATED TO DEFINE THOSE CHARACTERISTICS WHICH BEST CORRELATE WITH THE PERTINENT PILOT COMMENTS. A NEW MEASURE OF COMFORT LEVEL, EQUIVALENT VIBRATION LEVEL (VEQ) IS DEFINED. THESE QUANTITIES ARE CALCULATED FOR ALL LISSAJOUS' FIGURES, AND RESULTANT ACCELERATION IS SEEN TO BE THE MOST MEANINGFUL PARAMETER. AN IMPROVEMENT IN THE DEGREE OF CORRELATION BETWEEN MEASURED VIBRATION AND PILOT COMMENT IS SHOWN THROUGH THE USE OF VEQ FOR THE PATTERNS OF RESULTANT ACCELERATION, IN LIEU OF THE STANDARD VIBRATION CRITERIA.

269 001   0208   (*HELICOPTERS, *VIBRATION, DYNAMICS, FLIGHT TESTING, M EASUREMENTS.) (PILOTS, HUMAN ENGINEERING, PHYSIOLOGY.)   –
269 003   0212   THE EFFECT OF PRESSURE ON THE CRYSTALLIZATION OF POLYETHYLENE FROM DILUTE SOLUTION,

269 003   0212   LINEAR POLYETHYLENE WAS CRYSTALLIZED ISOTHERMALLY FROM 0.05% TOLUENE SOLUTION AT ATMOSPHERIC PRESSURE AND UP TO 6000 ATM HYDROSTATIC PRESSURE. AT ATMOSPHERIC PRESSURE A HIGH TEMPERATURE FORM OF UNKNOWN STRUCTURE WAS FOUND CRYSTALLIZING ABOVE 90 C. SINGLE CRYSTAL LAMELLAE CRYSTALLIZED BETWEEN 75 AND 90 C. DENDRITES WERE FORMED BELOW 75 C. THE TEMPERATURE DIVIDING THE DENDRITIC GROWTH FROM SINGLE CRYSTALLINE GROWTH INCREASES WITH INCREASING PRESSURE. THE THICKNESS OF CRYSTALS GROWN AT APPROXIMATELY CONSTANT SUPERCOOLING, BUT AT ELEVATED TEMPERATURE AND PRESSURE INCREASED ONLY SLIGHTLY. DETERMINATION OF THE MORPHOLOGY OF THE CRYSTALS AND THE THICKNESS OF SINGLE CRYSTAL PLATELETS WAS DONE USING AN INTERFERENCE MICROSCOPE.

269 003   0209   (TOLUENES, SOLUTIONS, *POLYMERS, *ETHYLENES, *CRYSTALLI ZATION, PRESSURE, HIGH PRESSURE RESEARCH, HIGH TEMPERATURE RESEARCH, *CR YSTALS, *SINGLE CRYSTALS, GROWTH, CRYSTAL STRUCTURE, THICKNESS, MEASUREM ENT, THEORY.) LABORATORY EQUIPMENT, MICROSCOPY.   –

269 002   0213   NO TITLE AVAILABLE

NO ABSTRACT AVAILABLE

269 002   0210   (*ELECTROMAGNETIC WAVES, PROPA-GATION, VERY LOW FREQUEN CY.) (*SOLID STATE PHYSICS, ELECTRONS, PARAMAGNETIC RESONANCE, NUCLEAR MAGNETIC RESONANCE.) (*ELECTROMAGNETIC WAVES, ANTENNAS, SCATTERING, REF LECTIONS.) (*FERROMAGNETISM, MATERIALS, MICROWAVES, RESONANCE. (*COMMUN ICATIONS THEORY, *CONTROL SYSTEMS, STATISTICAL ANALYSIS, ELECTRICAL NETW ORKS.)   –
269 008   0214   STRONG CONSISTENCY OF STOCHASTIC APPROXIMATION METHODS.

269 008   0214   THE STRONG CONVERGENCE PROPERTIES OF CERTAIN STOCHASTIC APPROXIMATION METHODS ARE PRESENTED. SUCH METHODS ARE USED IN STATISTICAL PROBLEMS TO ESTIMATE THE ROOT OF A REGRESSION EQUATION, OR TO ESTIMATE THE POINT AT WHICH A REGRESSION FUNCTION ACHIEVES ITS MAXIMUM.

269 008   0211   (STATISTICAL ANALYSIS, *PROBA-BILITY, *MEASURE THEORY, STATISTICAL DISTRIBU-TIONS, *STATISTICAL PROCESSES, MATRIX ALGEBRA.) THESES.   -

269 011   0215   AIR FORCE EVALUATION TESTING OF ATLAS D COMPONENTS THREE FUEL SHUT OFF VALVES GD/A PART   NUMBER 7-02281-15 B. H. HADLEY PART NUMBER   10576 SERIAL NUMBERS 114, 122, 135.

269 011   0215   THREE POWER OPERATED SHUTOFF VALVES, CURRENTLY IN USE IN D SERIES ATLAS MISSILES, WERE EVALUATED. TWO MAJOR AREAS OF MALFUNCTION WERE ENCOUNTERED. THE POSITION INDICATOR SWITCH WAS EXTREMELY SUSCEPTIBLE TO MALFUNCTION. SPECIFICALLY, INDICATOR SWITCH MALFUNCTIONING OCCURRED AS A RESULT OF INADEQUATE QUALITY CONTROL DURING ASSEMBLY, AS A RESULT OF EXPOSURE TO EXTREME LOW TEMPERATURES IN THE -65 F RANGE, AS A RESULT OF EXPOSURE TO HIGH AMBIENT HUMIDITY CONDITIONS, AND AS A RESULT OF SHOCK LOADING. TESTING, AND SUBSEQUENT RESULTS, INDICATE THE POSITION INDICATOR SWITCHES SHOULD BE REPLACED. THE BUTTERFLY SEAL, AFTER EXPOSURE TO AN AMBIENT OF -65 F WHEN DRY, I.E., NOT WETTED WITH FUEL, ALLOWED EXCESSIVE HELIUM LEAKAGE. IF THIS CONDITION COULD OCCUR IN OPERATIONAL SERVICE, THE BUTTERFLY SEAL SHOULD BE REDESIGNED TO PRECLUDE LEAKAGE AT THIS CONDITION. A DESCRIPTION OF THE TEST PROGRAM, ALONG WITH THE TEST EQUIPMENT EMPLOYED IS   INCLUDED.

269 011   0212   (TESTS OF *CUT-OFF VALVES, *BUTTERFLY VALVES IN GUIDED MISSILES, *FUEL SYSTEMS.) (GUIDED MISSILES, SURFACE TO SURFACE, FUEL SYSTEMS.)   -

269 016   0216   A VECTOR FORM OF COMPENSATION THEOREM AND ITS APPLICATION TO BOUNDARY-VALUE PROBLEMS.

269 016   0216   THE COMPENSATION THEOREM IS EXTENDED TO A VECTOR FORM. THE USE OF THE VECTOR FORM WOULD ENABLE ONE TO OBTAIN THE EXPRESSION FOR THE INCREMENTAL CHANGES IN THE ELECTRIC AND MAGNETIC VECTORS IN SPACE DUE TO A GIVEN SOURCE, UNDER THE CONDITION OF CHANGES IN THE ELECTRICAL CHARACTERISTICS IN A PORTION THE MEDIUM SURROUNDING THE SOURCE. IT IS WORTHWHILE TO POINT OUT THE NEED FOR DERIVING A VECTOR FORM OF THE THEOREM. THE PRESENT METHOD ENABLES ONE, IN A FIRST CASE, TO FORMULATE THE BOUNDARY VALUE PROBLEM IN TERMS OF FREDHOLM'S INTEGRAL EQUATION. THERE IS THEREFORE A POSSIBILITY OF OBTAINING APPROXIMATE SOLUTIONS OF THIS EQUATION BY USING ITERATIVE OR OTHER SYSTEMATIC SCHEMES.

269 016   0213   (*ELECTRICAL NETWORKS, *ELEC-TROMAGNETIC FIELDS, CONTINUOUS MEDIA, ELEC-TROMAGNETIC WAVES, DIELECTRICS, WAVEGUIDES, DIFFRACTION, SCATTERING, IMPEDANCE.) (*VECTOR ANALYSIS, INTEGRAL EQUATIONS.) -

269 018   0217   INVESTIGATION OF INTERACTION OF INTERSTITIAL IMPURITIES WITH DEFECTS IN BCC METALS.

269 018   0217   RESEARCH WAS CONDUCTED ON THE INTERACTION OF INTERSTITIAL IMPURITIES WITH DISLOCATIONS. AN EXTENSIVE INVESTIGATION OF THE COLD-WORK INTERNAL FRICTION PEAK DUE TO N AND C IN DEFORMED ALPHA-FE WAS MADE. SELF-ASSOCIATION OF INTERSTITIALS IN FE WAS ALSO STUDIED. THIS INVESTIGATION WAS CONCERNED WITH THE DEPARTURE FROM RANDOMNESS OF SOLID SOLUTIONS OF N AND C IN FE.

269 018   0214   (*METALS, *IRON, *WIRE, LATTICES, IMPURITIES, EFFECTIV
ENESS OF NITROGEN AND CARBON, ATOMS, DIFFUSION, CHEMICAL BONDS, THEORY.)
  (RELAXATION TIME, FRICTION, ELASTICITY, STRESSES, ENERGY, THERMODYNAM
ICS, MEASUREMENT, TEST METHODS.) (SOLIDS, SOLUTIONS, HEAT TREATMENT, DE
FORMATION.)   -
269 029   0218   DEVELOPMENT AND MANUFACTURE OF SPECIAL CALIBER .30
ELECTRIC PRIMERS.

269 029   0218   A NEW FIXTURE FOR HOLDING AND FIRING THE SWITCH WAS
MADE. PRIMERS WITH APPROXIMATELY 0.27 GRAINS OF XP-407 MIXTURE WERE
PRODUCED AND TESTED IN T2 SWITCHES WITH THE NEW FIXTURE. THERE WERE
NO FAILURES TC BREAK THE SWITCH FOIL AND NO DISRUPTION OF PARTS OF THE
SWITCH AND ELECTRODE ASSEMBLIES. AS A RESULT OF THESE TESTS, A 30HOLE
LABORATORY CHARGER PLATE WAS FABRICATED FOR CHARGING LARGER QUANTITIES
OF PRIMERS AT APPROXIMATELY 0.27 GRAINS FOR RELIABILITY TESTS IN T2
SWITCHES.

269 029   0215   (*ELECTRIC PRIMERS, ELECTRODES, SWITCHES, PRIMERS, MIXT
URES, CONDUCTIVITY, RELIABILITY, TESTS, TEST EQUIPMENT.) EXPLOSIVE ACTU
ATORS.   -
269 030   0219   SM 65. AIRBORNE POWER SUPPLY SYSTEM TEST 9FACTORYO
TEST PROCEDURE,

269 030   0219   THE PROCEDURE FOR TESTING THE AIRBORNE POWER SUPPLY
(APS) USING DECK 9-702 IN THE AUTOMATIC PROGRAMMED CHECKOUT EQUIPMENT
(APCHE) IS DESCRIBED. DECK 9-702 PERFORMS A TEST TO DETERMINE THE
OPERATIONAL READINESS OF THE APS. THE APS INVERTER IS STARTED ON
GROUND POWER WITH NO LOAD AND ITS VOLTAGE AND FREQUENCY ARE CHECKED.
THE INVERTER INPUT IS THEN TRANSFERRED TO INTERNAL (SIMULATED BATTERY)
POWER, AND ITS OUTPUT IS TRANSFERRED TO THE MISSILE LOADS. THE VOLTAGE
AND FREQUENCY OF THE INVERTER OUTPUT ARE AGAIN MEASURED.

269 030   0216   (*GUIDED MISSILES, SURFACE TO SURFACE, ELECTRICAL EQUIP
MENT, ELECTRONIC EQUIPMENT.) (AIRBORNE, *POWER SUPPLIES, AUTOMATIC, TES
T METHODS, *TEST SETS.)   -
269 033   0220   RESEARCH ON BINDER TECHNIQUES FOR HIGH TEMPERATURE
RADOME STRUCTURES.

269 033   0220   MICROWAVE ELECTRICAL DATA ON HIGH TEMPERATURE RADOME
MATERIALS, MICA LAMINATE AND SILICA FIBER-REINFORCED ALUMINUM PHOSPHATE
ARE DISCUSSED. PRELIMINARY DATA HAS BEEN GATHERED ABOUT SILICA
FIBER-REINFORCED ALUMINUM PHOSPHATE LAMINATES CONTAINING GLASS
MICROSPHERES. BOTH MATERIALS HAVE DIELECTRIC CHARACTERISTICS SUITABLE
FOR 1000 F RADOME APPLICATIONS. USE OF INORGANIC GLASS MICROSPHERES AS
FILLER FOR ALUMINUM PHOSPHATE BINDERS RESULTS IN LOWER PROCESSING
VISCOSITY, AND THE MICROSPHERE FILLER ALLOWS ABOUT HALF THE WATER TO BE
REMOVED FROM THE FORMULATIONS WITHOUT CAUSING HIGH VISCOSITY OR
PREMATURE GELLING. NO IMPROVEMENT IN ELECTRICAL CHARACTERISTICS WAS
NOTED. ONE FORMULATION PRESENTED GREATER LAMINATE FLEXURAL STRENGTH.
LONG-TERM AGING PROBLEMS EXIST IN THE SILICA FIBER-ALUMINUM PHOSPHATE
LAMINATE SYSTEM. THE LAMINATES LOSE AS MUCH AS ONE-HALF OF THEIR 1000
FLEXURAL STRENGTH AFTER EXPOSURE FOR 100 HOURS AT 1000 F. EVEN MORE
DRASTIC LOSS IN STRENGTH OCCURS BETWEEN INITIAL ROOM TEMPERATURE
STRENGTH AND ROOM TEMPERATURE STRENGTH AFTER EXPOSURE TO ELEVATED
TEMPERATURES. THE MICA LAMINATE (XS-1342) DOES NOT EXHIBIT THIS LOSS
AT 800 F.

269 033   0217   (*RADOMES, MATERIALS, REINFORC-ING MATERIALS, CERAMIC M
ATERIALS, CERAMIC FIBERS, ASBESTOS FIBERS, MICA, ALUMINUM COM-POUNDS, PH
OSPHATES, SILICON COMPOUNDS, DIOXIDES, GLASS, SPHERES, *LAMINATES, *BIND
ERS, FILAMENT WOUND CONSTRUCTION.)   (HIGH TEMPERATURE RE-SEARCH, DIELECT
RIC PROPERTIES, MECHANICAL PROPERTIES, VISCOSITY, MANUFACTURING METHODS,
 AGING.)   POROUS MATERIALS.   -
269 034   0221   RESEARCH AND DEVELOPMENT ON THERMOCOUPLE ENERGY
CONVERTERS 9PHASE IIO.

269 034   0221   EFFORTS ARE BEING MADE TO DEVELOP TECHNIQUES FOR
FABRICATING, IN QUANTITY, GOOD QUALITY N- AND P-TYPE THERMOELECTRIC
LEAD TELLURIDE CELLS AND TO ASSEMBLE THESE CELLS TO FORM 2
THERMOELECTRIC DEVICES WHICH WILL MEET THE FOLLOWING REQUIREMENTS (A)
EACH OF THE 2 THERMOCOUPLE ENERGY CONVERTERS WILL CONSIST OF 9 COUPLES
AND WILL HAVE AN OUTPUT OF 7.5 WATTS/CUBIC INCH OR BETTER AT A MINIMUM
LOAD CURRENT OF 20 AMP WHEN A TEMPERATURE GRADIENT OF AT MOST 600 K/CM
EXISTS ACROSS THE THERMOELECTRIC MATERIAL   (B) THE CONVERTERS WILL BE
CAPABLE OF OPERATION WITH THE HOT SIDE OF THE THERMOELECTRIC MATERIAL
NEAR ITS MELTING POINT (917 C) AND THE PERFORMANCE INDICATED SHOULD BE
ATTAINABLE AT A HOT SIDE TEMPERATURE OF AT LEAST 1000 K   AND (C) THE
DEVICES SHOULD BE OPERABLE FOR A MINIMUM OF ONE HOUR. CURRENT EFFORT
HAS RESULTED IN PERFECTING THE CASTING TECHNIQUE SO THAT N- AND P-TYPE
CELLS CAN BE MANUFACTURED IN QUANTITY. ALSO, THE DESIGN AND
FABRICATION OF THE COMPLETE CELL ASSEMBLY INCLUDING A HERMETIC SEAL AT
THE COLD JUNCTION SIDE, HAVING A MAXIMUM TEMPERATURE CAPABILITY OF 780
C, WAS REALIZED. (AUTHOR)   AD-269 0349N6

269 034   0218   (*THERMOCOUPLES, *THERMOELEC-TRICITY, *POWER SUPPLIES,
LEAD COMPOUNDS, TELLURIDES, MANUFACTURING METHODS, DESIGN.) (GENERATORS,
 SEALS, MATERIALS.)   -
269 035   0222   A NUMERICAL METHOD FOR COMPUTING RADIATIVE
TEMPERATURE CHANGES NEAR THE EARTH'S SURFACE,

269 035   0222   A METHOD OF COMPUTING THE TEMPERATURE CHANGES DUE TO
INFRARED RADIATION FLUX DIVERGENCE IS PRESENTED. THE METHOD IS BASED
UPON A TABULAR SCHEME DEVELOPED BY D. L. BROOKS (J. METEOR. 7313-321,
1950). APPLICATION OF THE METHOD TO ACTUAL DATA SHOWS THAT THE
RADIATIVE TEMPERATURE CHANGES CAN EXCEED THE OBSERVED TEMPERATURE
CHANGES AT NIGHT. THE RADIATIVE TEMPERATURE CHANGES DECREASE WITH
ELEVATION AND BECOME 1 - 2 DEGREES PER DAY AT ABOUT 100 METERS.
SEVERAL APPLICATIONS OF THE METHOD IN BOUNDARY LAYER STUDIES ARE ALSO
INDICATED.

269 035   0219   (NUMERICAL ANALYSIS, *INFRARED RADIATION, EARTH, SURFAC
E PROPERTIES.) (TEMPERATURE, ATMOSPHERE, *CLIMATE, WATER VAPOR, SPECIFIC
 HEAT, AIR, DENSITY, FOG.) (DIGITAL COMPUTERS, PROGRAMMING, PARTIAL DIFF
ERENTIAL EQUATIONS.)   -
269 037   0223   RESEARCH AND DEVELOPMENT STUDY ON STRESS-STRAIN
CHARACTERISTICS OF SHELLS AND HIGH EXPLOSIVES.

269 037   0223   A COMPLETE EXPERIMENTAL AND THEORETICAL ELASTIC
ANALYSIS HAS BEEN MADE OF THE FLAT BASE SHELL AND A PROCEDURE FOR
PROGRAMMING THE ANALYSIS ON A DIGITAL COMPUTER HAS BEEN PROVIDED.
EXCELLENT PROGRESS WAS MADE ON THREE PRINCIPAL REMAINING PROBLEMS,
NAMELY THE BEHAVIOR OF FILLER MATERIALS, THE INTERACTION BETWEEN
FILLER AND SHELL, AND YIELDING OF THE SHELL IN THE VICINITY OF THE
ROTATING BAND.

269 037   0220   (*PROJECTILES, DESIGN, ROTATING BANDS, EXPLOSIVES, *STR
ESSES, DEFORMATION, ELASTICITY, PLASTICITY.)   -
269 040   0224   INSTRUMENTATION FOR THE DETERMINATION OF THE
COMPOSITION OF THE UPPER ATMOSPHERE.

269 040   0224   THE ROCKET-BORNE HELIUM MASS SPECTROMETER TESTING
WAS BEGUN TO FIND THE OPTIMUM OPERATING CHARACTERISTICS OF THE SYSTEM.
THE MAIN EMPHASIS IN THE SURVEY OF LITERATURE DEALING WITH HELIUM IN
THE ATMOSPHERE WAS FOCUSED ON PAPERS FROM THE   USSR.   HELIUM PARTIAL
PRESSURE PROFILES WERE CALCULATED FOR DIFFERENT ASSUMPTIONS ABOUT THE
HEIGHT OF THE MICTOPAUSE.   THE ATOMIC SPECIES CALIBRATION SYSTEM WAS
TESTED IN THE LABORATORY AND MODIFICATIONS BASED ON THESE OPERATIONS
HAVE BEEN INITIATED IN ORDER TO PRODUCE A BETTER   OVER-ALL SYSTEM.   THE
ORIGINAL OF THE GCA COLD CATHODE IONIZATION GAUGE WAS OPERATED IN THE
LABORATORY AND A NEW, ALL FUSION WELDED, METALCERAMIC GAUGE WAS
DESIGNED AND ASSEMBLED FOR TESTING.   THE VACUUM GAUGE CALIBRATION
SYSTEM WAS USED TO CALIBRATE IONIZATION GAUGES AS A SECONDARY PRESSURE
STANDARD.   A REVISION OF THE 1959 ARDC STANDARD ATMOSPHERE WAS ISSUED
DURING THE PAST PERIOD BY COESA.   THIS REVISION WAS A RESULT OF AN
INTENSIVE SURVEY OF RECENT ATMOSPHERIC RESEARCH LITERATURE   THE BASIS
FOR THIS REVISION IS DISCUSSED.

269 040   0221   (*GEOPHYSICS, SOUNDING ROCKETS, MASS SPECTROMETERS, INS
TRUMENTATION, DESIGN, TESTS FOR *MASS SPECTROSCOPY OF OXYGEN, HELIUM IN
ATMOSPHERE, *UPPER ATMOSPHERE, SPECTROGRAPHIC ANALYSIS.)   (IONIZATION GA
GES, PRESSURE GAGES, MANOMETERS, CALIBRATION, TESTS.)   (ATMOSPHERE MODEL
S, ANALYSIS.)   -
269 043   0225   A PILOT STUDY OF TEMPORARY THRESHOLD SHIFTS RESULTING
FROM EXPOSURE TO HIGH-TENSITY IMPULSE NOISE,

269 043   0225   THIS INVESTIGATION WAS A PILOT STUDY TO DETERMINE
THE TEMPORARY THRESHOLD SHIFTS RESULTING FROM EXPOSURE TO
HIGH-INTENSITY IMPULSE NOISE.   THE THRESHOLD SHIFTS INDUCED WERE OF A
TEMPORARY NATURE, I.E., THERE WERE NO INSTANCES OF PERMANENT HEARING
LOSSES ALONG ANY OF THE EXPERIMENTAL SUBJECTS.   THE PURPOSE WAS TO
EXPLORE VARIOUS PHYSICAL PARAMETERS OF A SOUND SOURCE AND RELATE THEM
TO ANY DECREMENTS THEY MAY HAVE ON AUDITORY ACUITY.   THIRTY ENLISTED
MEN RECEIVED AUDIOMETRIC TESTS BOTH BEFORE AND AFTER EXPOSURE TO A
HIGH-INTENSITY IMPULSE NOISE GENERATED BY AN M-14 RIFLE.   RATE AND
NUMBER OF IMPULSES WERE VARIED SEPARATELY AND EXAMINED AT THREE TEST
FREQUENCIES.   DUE TO INTER-SUBJECT DIFFERENCES, ONLY GENERAL
IMPLICATIONS ARE INDICATED.   RECOMMENDATIONS ARE INCLUDED FOR FUTURE
RESEARCH.

269 043   0222   (*NOISE, AUDITORY SIGNALS, HEARING, *AUDITORY THRESHOLD
S, AUDITORY ACUITY, SENSITIVITY, HAZARDS.)   (MILITARY PERSONNEL, *HUMAN
ENGINEERING.)   (ORDNANCE, WEAPONS.)   -
269 047   0226   PRODUCTION ENGINEERING MEASURES FOR QUARTZ   CRYSTAL
FILTER UNITS AT 15MC, 20MC, 20.55MC, 25MC, 30MC.

269 047   0226   CRYSTAL FILTERS AT 15, 20, 20.55, 25 AND 30 MC WILL
BE FABRICATED FROM NATURAL AND CULTURED QUARTZ, ANTICIPATING THE
POSSIBLE SHORTAGE OF NATURAL QUARTZ DURING A NATIONAL EMERGENCY. MASS
PRODUCTION TECHNIQUES AND FACILITIES WILL BE DEFINED WHICH WILL MAKE IT
POSSIBLE TO REDUCE THE TIME REQUIRED FOR DELIVERY OF PRODUCTION
QUANTITIES DURING AN EMERGENCY. THE BASIC DESIGN CONCEPT TO BE USED ON
ALL CRYSTAL FILTER UNITS WAS ESTABLISHED AND DETAILED DESIGN WORK WAS
INITIATED.

269 047   0223   (*QUARTZ CRYSTALS, *CRYSTAL FILTERS, CRYSTALS, HIGH FR
EQUENCY, RADIO-FREQUENCY FILTERS, QUARTZ RESONATORS, DESIGN, *PRODUCTION
, *MANUFACTURING METHODS, TESTS.)   —
269 050   0227   ELECTROCHEMISTRY OF FUSED SALTS.

269 050   0227   A LIST OF TITLES TECHNICAL REPORTS AND PUBLICATIONS
ARISING FROM RESEARCH UNDER THIS CONTRACT IS PRESENTED. PRELIMINARY
RESULTS ARE GIVEN OF AN INVESTIGATION OF THE H-HYDRIDE ION ELECTRODE IN
MOLTEN LICL-KCL EUTECTIC AT 450 C. THE INITIAL ATTEMPTS AT MEASUREMENT
OF THE POTENTIAL OF THE H-HYDRIDE ION ELECTRODE WERE UNSUCCESSFUL
BECAUSE OF THE CHEMICAL INSTABILITY OF HYDRIDE IN THE PRESENCE OF
AVAILABLE CONTAINER MATERIALS.

269 050   0224   (*ELECTROCHEMISTRY, *LIQUID METALS, *SALTS, METALLIC CO
MPOUNDS, HALIDES, ELECTRIC POTENTIAL, MEASUREMENT.) (HYDROGEN, HYDRIDES
, IONS, ELECTRODES IN *LITHIUM COM-POUNDS, *POTASSIUM COMPOUNDS, *CHLORI
DES, EUTECTICS.) HIGH TEMPERATURE RESEARCH, LABORATORY FURNACES.   —
269 052   0228   PROTEIN AND AMINO ACID NUTRITION OF MAN IN HEALTH AND
DISEASE.

269 052   0228

269 052   0225   (*NUTRITION, *PROTEINS, *AMINO ACIDS, HORMONES, CHOLEST
EROL.)   —
269 053   0229   AUTOMATIC DATA PROCESSING SYSTEM MINIMAL INFORMER.

269 053   0229   PROGRESS IS REPORTED ON THE DESIGN EVALUATION AND
TESTING IN EACH OF THE AREAS OF THE MINIMAL INFORMER SYSTEM. FURTHER
DETAILS ARE AVAILABLE IN THE PRELIMINARY DESIGN PLAN AND THE ADDENDUM
FOR THE DC/R EQUIPMENT, THE FINAL DESIGN PLAN, AND THE MAINTENANCE AND
OPERATIONAL MANUALS OF THE MINIMAL INFORMER SYSTEM.

269 053   0226   (*DATA PROCESSING SYSTEMS, DATA STORAGE SYSTEMS, MAGNET
IC TAPE, AUTOMATIC, DESIGN, TEST EQUIPMENT, TESTS.)   —
269 056   0230   FIBERGLASS MOTOR CASE STUDY. POLARIS SECOND STAGE
END CLOSURE.

269 056   0230   INVESTIGATIONS WERE MADE TO PREPARE HARDWARE AND
DETERMINE DEFLECTION AND STRESS CHARACTERISTICS ON THE SCALE MODEL
POLARIS ROCKET CASE CONFIGURATION. THE FABRICATION IS DESCRIBED OF THE
HYDROSTATIC TEST RIG FOR THE 1/4 SCALE POLARIS CASE. FABRICATION AND
TESTING OF THE INITIAL 1/4 SCALE MODEL POLARIS CASE IS ALSO DESCRIBED.
THE CASE WAS CHECKED AT 40 PSIG AND THEN BROUGHT UP TO THE PROOF
PRESSURE OF 390 PSIG AT A RATE OF 150 PSIG PER MINUTE AND REMAINED AT
THIS PRESSURE FOR ONE MINUTE. THE PRESSURE WAS THEN REDUCED TO 50 PSIG
TO PERMIT REMOVAL OF SEVERAL DIAL INDICATORS WHICH WOULD BE DAMAGED
DURING THE SUBSEQUENT BURST TEST. THE CASE WAS THEN REPRESSURIZED AT
APPROXIMATELY 42 PSIG PER SECOND UNTIL BURST OCCURRED AT 590 PSIG. THE

FAILURE OCCURRED AT THE DOME SKIRT JUNCTURE AND EXTENDED ABOUT 220
DEGREES AROUND THE CIRCUMFERENCE. PRELIMINARY CALCULATIONS SHOW THE
COMPOSITE HOOP WALL STRESS IN THE CYLINDER (BASED ON WALL THICKNESS) AT
FAILURE WAS 127,000 PSI YIELDING A HOOP AND LONGITUDINAL GLASS LOADING
OF 6.3 LB/END AND 6/18 LB/END, RESPECTIVELY.

269 056   0227   (*GUIDED MISSILES, UNDERWATER TO SURFACE, ROCKET MOTORS
, *ROCKET CASES, GLASS TEXTILES, FILAMENT WOUND CONSTRUCTION, HYDROSTATI
C PRESSURE, STRESSES, TESTS, MODEL TESTS.)   -
269 057   0231   ON COMPUTING MINIMA BY THE PENALTY FUNCTION APPROACH,

269 057   0231   NO ABSTRACT AVAILABLE

269 057   0228   (*CALCULUS OF VARIATIONS, DIG-ITAL COMPUTERS, PROGRAMMI
NG, DATA STORAGE SYSTEMS, PARTIAL DIFFERENTIAL EQUATIONS, NUMERICAL ANAL
YSIS.)   -
269 058   0232   STUDY OF THE WELDED ROTATING BAND FOR 20MM AIRCRAFT
AMMUNITION,

269 058   0232   A STUDY WAS CONDUCTED TO DETERMINE CAUSES FOR THE
LOW BARREL LIFE WITH OVERLAY WELDED ROTATING BANDS ON 60/20MM AIRCRAFT
AMMUNITION. EXTENSIVE METALLURGICAL DATA WERE COMPILED ON ALL TEST
ITEMS TO AID IN THE EVALUATION OF TEST RESULTS, AND TO ASSURE
RECOGNITION OF PERTINENT WELDED BAND PARAMETERS. TEST RESULTS
CONFIRMED EXISTING PRINCIPLES THAT FRINGING CAN BE ALLEVIATED OR
ELIMINATED BY THE DESIGN OF THE BAND ITSELF AND THAT THE IRON CONTENT
OF THE BAND IS AFFECTED BY TEMPERATURE OF APPLICATION AND HAS NO
APPRECIABLE EFFECT ON BARREL LIFE.

269 058   0229   (*AIRCRAFT AMMUNITION, HIGH EXPLOSIVE AMMUNITION, INCEN
DIARY AMMUNITION, PROJECTILES, *ROTATING BANDS, WELDS, DESIGN, TESTS, ME
TALLURGICAL ANALYSIS.) (AIRCRAFT GUNS, AUTOMATIC WEAPONS, GUN BARRELS,
ERO-SICN.) SWITZERLAND.   -
269 064   0233   THEORETICAL AND EXPERIMENTAL INVESTIGATION OF
LARGE-SIGNAL TRAVELING-WAVE TUBES.

269 064   0233   A GENERAL 2-DIMENSIONAL NONLINEAR INTERACTION THEORY
IS DEVELOPED FOR TRAVELING-WAVE TUBES AND SPECIALIZED TO INCLUDE
KLYSTRONS. THE EQUATIONS ARE DEVELOPED USING A LAGRANGIAN ANALYSIS AND
THE SPACE-CHARGE FIELDS ARE FOUND BY 2-DIMENSIONAL GREEN'S FUNCTION
TECHNIQUES. EXPERIMENTAL DATA ARE GIVEN ON A UHF CRESTATRON DESIGNED
TO OPERATE OVER THE FREQUENCY RANGE FROM 300 TO 900 MC. BOTH COLD-TEST
AND HOT-TEST MEASUREMENTS ARE GIVEN ON TUBE NO. 4 OPERATING UNDER
PULSED CONDITIONS. THE DESIGN OF A MICROPERVEANCE-ONE AXIALLY
SYMMETRIC ELECTRON GUN WITH THE POISSON CELL IS OUTLINED AND DETAILED
INFORMATION ON THE SPACE-CHARGE DENSITY DISTRIBUTION AND POTENTIAL
GRADIENT AT THE CATHODE ARE GIVEN.

269 064   0230   (*TRAVELING WAVE TUBES, *KLYS-TRONS, *MICROWAVE A MPLIF
IERS, ULTRA HIGH FREQUENCY, HELIXES, S BAND, THEORY.) (AMPLI-FIERS, ELE
CTRON TUBES, *ELECTRON GUNS, CATH-ODES (ELECTRON TUBES), SPACE CHARGES,
DENSITY, DISTRIBUTION, GREEN S FUNCTION, MATHEMATICAL ANALYSIS.) (ELECT
RON BEAMS, PLASMA PHYSICS, GAS IONIZATION, ELECTRIC FIELDS.)   -

269 067   0234   RESEARCHES ON HYDROGEN OVERVOLTAGE ON METALLIC SINGLE
CRYSTALS BISMUTH.

269 067   0234   HYDROGEN OVERVOLTAGE ON BI POLYCRYSTALLINE AND
SINGLE CRYSTAL CATHODES, ORIENTED FOLLOWING THE (100), (110) AND (111)
PLANES, WAS INVESTIGATED IN HCLO4 SOLUTIONS IN A CURRENT DENSITY RANGE
TO 100 AMP/SQ M AT 25 AND 55 C. THE TAFEL LAW HOLDS TRUE AT HIGH
CURRENT DENSITY VALUES THE PARAMETERS BEING DIFFERENT FOR THE
DIFFERENT ELECTRODES. IN THE LOWER CURRENT DENSITY RANGE, THE
BEHAVIOR, AS REVEALED BY OSCILLOGRAPHIC RECORDINGS, IS ANOMALOUS AND
DIFFERENT FROM THAT OBSERVED WITH OTHER METALS.

269 067   0231   (ELECTROCHEMISTRY, HYDROGEN, VOLTAGE ON *BISMUTH, CRYST
ALS, *SINGLE CRYS-TALS, METALLIC CRYSTALS, ELECTRODES IN PERCHLORIC ACID
, SOLUTIONS, MEASUREMENT, OSCILLOGRAMS.)   -
269 068   0235   A FACTOR ANALYSIS OF PERSONNEL SELECTION DATA INTRA-
AND INTER-AREA RELATIONSHIPS OF BIOCHEMICAL, PHYSIOLOGICAL,
PSYCHOLOGICAL, AND ANTHROPOMETRIC MEASURES,

269 068   0235   TESTS USED IN ROUTINE SCREENING, TOGETHER WITH
SPECIAL ADDITIONAL MEASURES, WERE ADMINISTERED TO 120 RANDOMLY SELECTED
ENLISTED SUBMARINE CANDIDATES UNDER CAREFULLY CONTROLLED CONDITIONS.
THE 362 VARIABLES INCLUDED DATA FROM THE BIOCAL, ANTHROPOMETRICAL, AND
PHYSICAL EXAMINATION FIELDS. DATA FOR THE VARIOUS AREA STUDIES ARE
APPENDED IN SUFFICIENT DETAIL TO PERMIT ADDITIONAL INVESTIGATIONS BY
INTERESTED SPECIALISTS. THESE INCLUDE MATERIAL ON THE BIOCHEMISTRY OF
NERVOUS STABILITY CO-RELATIONAL RELATIONSHIPS OF THE VARIOUS WHITE
BLOOD CELLS IN HEALTHY MALE ADULTS PHYSICAL FITNESS, ANTHROPOMETRIC
AND SOMATOTYPING MEASURES TWO INDEPENDENT SCORINGS OF THE RORSCHACH
INK-BLOT TEST PERSONAL INTERVIEWS GIVEN EACH SUBJECT SEPARATELY BY TWO
INTERVIEWERS, AND SEVERAL PSYCHOLOGICAL TESTS EMPLOYED IN SELECTION.

269 068   0232   (*NAVAL PERSONNEL, *MILITARY PERSONNEL, *SELECTION, TES
TS.) (*FACTOR ANALYSIS, BIOCHEMISTRY, PHYSIOLOGY, PHYSICAL FITNESS, PSY
CHOLOGY, ANTHROPOMETRY, DATA.)   -
269 071   0236   SOME PROPERTIES OF GENERALIZED AXIALLY SYMMETRIC
POTENTIALS,

269 071   0236   SOME PROPERTIES OF THE FUNCTIONS OF GENERALIZED
AXIALLY SYMMETRIC POTENTIAL THEORY (GASPT) ARE INVESTIGATED BY THE
SONINE-BERGMAN OPERATOR. GASPT FUNCTION ELEMENTS ARE CONSIDERED IN THE
CASE OF ENTIRE AND MEROMORPHIC ASSOCIATES. THEOREMS CONCERNING
INEQUALITIES AND LOCATION OF SINGULARITIES ARE OBTAINED.

269 071   0233   (OPERATORS (MATHEMATICS), COMPLEX VARIABLES, TRANSFORM
ATIONS (MATHE-MATICS), *PARTIAL DIFFERENTIAL EQUATIONS, POTENTIAL THEORY
, POLYNOMIALS.)   -
269 079   0237   MINIATURE THIN-FILM INDUCTORS.

269 079   0237   RESEARCH WAS CONTINUED ON THE DEVELOPMENT OF A
METHOD FOR FABRICATING MINIATURE INDUCTORS EMPLOYING THIN-FILM SPIRAL
CONDUCTORS ON FERRITE SUBSTRATES. STUDIES AND EVALUATIONS ARE
PRESENTED OF VARIOUS FERRITE SUBSTRATES, THE FABRICATION OF CONDUCTING
SPIRAL PATTERNS, AND MEASUREMENT OF THE INDUCTANCES AND Q VALUES
OBTAINED AT ONE MEGACYCLE PER SECOND. THE CHOICE OF FERRITE MATERIALS
IS DISCUSSED ALONG WITH TECHNIQUES FOR OBTAINING LARGE-VALUE
INDUCTANCES.

269 079   0234   (*COILS, *RADIOFREQUENCY COILS, *MINIATURE ELECTRONIC E
QUIPMENT, FERROMAGNETIC MATERIALS, FERRITES, THIN FILMS, NICKEL ALLOYS,
ZINC ALLOYS, COBALT ALLOYS, ELECTROPLATING, PROCESSING, *MANUFACTURING M
ETHODS, PRODUCTION, DESIGN.)   (COILS, INDUCTANCE, MEASUREMENT.)   −
269 081   0238   THERMODYNAMIC PROPERTIES OF POLYETHYLENE,

269 081   0238   THE LACK OF FUNDAMENTAL DATA ON THE PROPERTIES OF
POLYETHYLENE PROMPTED A STUDY OF THE AVAILABLE THERMODYNAMIC PARAMETERS
OF THIS MATERIAL. FROM PUBLISHED DATA THE ENTROPY, ENTHALPY, AND
GIBBS FREE ENERGY VALUES OF CONVENTIONAL HIGH PRESSURE POLYETHYLENE
WERE CALCULATED OVER THE RANGE 0 TO 315 K. THE USE OF A LINEAR
TARASSOV FUNCTION TO ESTIMATE THE SPECIFIC HEAT OF POLYETHYLENE IS
DISCUSSED. THE THERMODYNAMIC FUNCTION, CP/T VERSUS T, HAS BEEN
CALCULATED AND EXHIBITS AN INCREASE AT 60 K. AN APPROXIMATION IS MADE
OF THE NUMBER OF VIBRATING UNITS PER REPEATING UNIT AT 273 K. CP−CV IS
CALCULATED AT 273 K AND FOUND TO BE 0.082 CAL/DEG GM.

269 081   0235   (*POLYMERS, *ETHYLENES, *THERMO-DYNAMICS, SPECIFIC HEAT
, ENTROPY, ENTHALPY, TRANSITION TEMPERATURE, THEORY.)   −
269 082   0239   TABLES OF INTERFERENCE FACTORS FOR USE IN WIND-TUNNEL
AND GROUND-EFFECT CALCULATIONS FOR VTOL-STOL AIRCRAFT. PART I − WIND
TUNNELS HAVING WIDTH-HEIGHT RATIO OF 2.0,

269 082   0239   TABLES OF INTERFERENCE FACTORS FOR USE IN
WIND-TUNNEL AND GROUND-EFFECT CALCULATIONS FOR VTOL-STOL AIRCRAFT ARE
PRESENTED FOR WIND TUNNELS HAVING A WIDTH-HEIGHT RATIO OF 2.0. THESE
TABLES WERE MACHINE-CALCULATED AND ARE INTENDED FOR USE WITH THE
PROCEDURES OF NASA TECHNICAL REPORT R-124. THESE TABLES ARE PRESENTED
WITHOUT COMMENT.

269 082   0236   (*VERTICAL TAKE-OFF PLANES, *SHORT TAKE-OFF PLANES, WIN
D TUNNEL MODELS, *WIND TUNNELS, CONFIGURATION, GROUND EFFECT, INTERFEREN
CE, AERODYNAMICS, MATHEMATICAL ANALYSIS, TABLES.)   −
269 087   0240   ERROR PROBABILITY OF CASCADED BINARY COMMUNICATION
LINKS PERTURBED BY ADDITIVE GAUSSIAN NOISE AND RAYLEIGH FADING,

269 087   0240   THE PERFORMANCE OF CASCADED BINARY COMMUNICATION
LINKS IN THE PRESENCE OF ADDITIVE WHITE GAUSSIAN NOISE IS INVESTIGATED
FOR THE CASES OF CONSTANT AND RAYLEIGH DISTRIBUTED SIGNAL LEVELS. AN
EXACT EXPRESSION IS DERIVED FOR OVER-ALL ERROR PROBABILITY FOR ANY
NUMBER OF LINKS WITH CONSTANT SIGNAL LEVELS. WITH RAYLEIGH FADING, THE
CASES OF INDEPENDENT AND COMPLETELY CORRELATED FADING ARE CONSIDERED.
AN EXACT EXPRESSION IS DERIVED FOR AVERAGE OVER-ALL ERROR PROBABILITY
FOR ANY NUMBER OF LINKS WITH INDEPENDENT RAYLEIGH FADING AND IDENTICAL
AVERAGE SIGNAL-TO-NOISE RATIOS IN EACH LINK. A SIMPLE APPROXIMATION TO
THIS EXPRESSION IS PRESENTED FOR HIGH AVERAGE S/N. ALTHOUGH THE CASE
OF COMPLETELY CORRELATED FADING DOES NOT YIELD A GENERAL SOLUTION IN
TERMS OF THE NUMBER OF CASCADED LINKS, EXACT SOLUTIONS FOR AVERAGE
OVER-ALL ERROR PROBABILITY FOR 2 AND 3 LINKS ARE DETERMINED.

269 087   0237   (*COMMUNICATIONS THEORY, RADIO SIGNALS, *RADIO TRANSMIS
SION, SIGNAL-TO-NOISE RATIO, ATTENUATION, ABSORPTION, ERRORS.) (RADIO CO
MMUNICATION SYSTEMS, RADIO RELAY SYSTEMS, DIGITAL SYSTEMS, DATA TRANSMIS
SION SYSTEMS.) (SATELLITE VEHICLES, COMMUNICATION SYSTEMS, VERY HIGH FR
EQUENCY, ULTRA HIGH FREQUENCY.)   −

269 089   0241   PHOTODEGRADATION OF HIGH POLYMERS.   PART III -
PHOTOLYSIS OF POLY9METHYL METHACRYLATEO IN VACUUM AND IN AIR.

269 089   0241   THE PHOTODEGRADATION OF POLY(METHYL METHACRYLATE)
FILMS IN VACUUM AND IN AIR BY UV RADIATION FROM A MEDIUM-PRESSURE
MERCURY LAMP HAS BEEN INVESTIGATED AT ROOM TEMPERATURE. CHANGES IN
WEIGHT IN TERMS OF INTRINSIC VISCOSITIES, THE FORMATION OF VOLATILE
SUBSTANCES, AND THE INCREASE IN THE UV ABSORPTION OF THE FILMS WERE
FOLLOWED   AS A FUNCTION OF ENERGY ABSORBED. QUANTUM   YIELDS FOR RANDOM
CHAIN SCISSION IN POLY(METHYL   METHACRYLATE) ARE ABOUT 0.04 AND 0.02 IN
VACUUM AND IN AIR, RESPECTIVELY. QUANTUM YIELDS IN VACUUM ARE THE
SAME AT 2 AND 0.02 MICRONS PRESSURE. THE QUANTUM YIELD FOR METHYL
FORMATE IS APPROXIMATELY THAT FOR CHAIN SCISSION   THE FORMATE IS
ACCOMPANIED BY LARGER AMOUNTS OF METHANOL AND VERY SMALL QUANTITIES OF
MONOMER. INCREASED UV ABSORPTION OCCURS AFTER EXTENSIVE DEGRADATION IN
EITHER AIR OR VACUUM AND IS DUE TO CHROMOPHORES FORMED IN THE POLYMER
RATHER THAN IN LOW MOLECULAR WEIGHT FRAGMENTS.

269 089   0238   (*POLYMERS, *METHYL RADICALS, *ACRYLIC RESINS, THIN FIL
MS, *ORGANIC COATINGS, DECOMPOSITION BY *PHOTOLYSIS, VACUUM SYSTEMS, AI
R, ULTRAVIOLET RADIATION, STABILITY, SOLU-TIONS, VISCOSITY, MOLECULAR WE
IGHT.) (SOLAR ENERGY, SIMULATION.)   -
269 090   0242   THE CHARACTERISTICS OF ELECTRIC SPARK DISCHARGES IN
MIXTURES OF HIGH-EXPLOSIVE AND ALUMINUM POWDERS,

269 090   0242   A METHOD IS DESCRIBED FOR OBTAINING THE AVERAGE
RESISTANCE OF A SPARK DISCHARGING THROUGH A GRANULAR CONDUCTIVE MIX IN
A NON-OSCILLATING DISCHARGE SYSTEM. THE SPARK RESISTANCE IS A LINEAR
FUNCTION OF THE SPARK GAP WIDTH FOR A GIVEN ELECTRODE ARRANGEMENT. THE
RESISTANCE IS RELATIVELY INDEPENDENT OF THE DENSITY OF THE MIX OVER THE
RANGE 0.7 TO 0.9 OHM.

269 090   0239   (*EXPLOSIVES, *ALUMINIZED EXPLOSIVES, ALUMINUM, POWDER
METALS, RDX, CARBOHYDRATES, *SPARKS, *ELECTRIC DISCHARGES.) (SPARKS, ELE
CTRIC DISCHARGES, CIRCUITS, TESTS, RESISTANCE, MEASUREMENT.) (EXPLOSIVE
S, DETONATION.)   -
269 091   0243   TABLES OF INTERFERENCE FACTORS FOR USE IN WINDTUNNEL
AND GROUND-EFFECT CALCULATIONS FOR VTOLSTOL AIRCRAFT. PART II - WIND
TUNNELS HAVING WIDTH-HEIGHT RATIO OF 1.5,

269 091   0243   TABLES OF INTERFERENCE FACTORS FOR USE IN WINDTUNNEL
AND GROUND-EFFECT CALCULATIONS FOR VTOLSTOL AIRCRAFT ARE PRESENTED FOR
WIND TUNNELS HAVING A WIDTH-HEIGHT RATIO OF 1.5. THESE TABLES WERE
MACHINE-CALCULATED AND ARE INTENDED FOR USE WITH THE PROCEDURES OF NASA
TECHNICAL REPORT R-124. THESE TABLES ARE PRESENTED WITHOUT COMMENT.

269 091   0240   (*VERTICAL TAKE-OFF PLANES, *SHORT TAKE-OFF PLANES, WIN
D TUNNEL MODELS, *WIND TUNNELS, CONFIGURATION, GROUND EFFECT, INTERFEREN
CE, AERODYNAMICS, MATHEMATICAL ANALYSIS, TABLES.)   -
269 092   0244   POLYSTATION DOPPLER TRACKING.

269 092   0244   THE MATHEMATICS FOR POLYDOP IS PRESENTED. THE
DEVELOPMENT STARTS WITH THE DERIVATION OF THE BASIC MATHEMATICAL
RELATIONS. THE CONDITIONS NECESSARY FOR THE EXISTENCE OF A UNIQUE
SOLUTION TO THESE EQUATIONS ARE DISCUSSED, AND THE SOLUTIONS TO A
NUMBER OF POLYDOP SYSTEM EQUATIONS ARE PRESENTED. THE PROBLEMS THAT
APPEAR WHEN MORE THAN ONE VEHICLE IS IN THE REGION OF OBSERVATION OF

THE SYSTEM AT ANY GIVEN TIME ARE DISCUSSED. SITUATIONS ARE CONSIDERED IN WHICH THE SAME DATA MIGHT BE TAKEN EVEN IF THE VEHICLE PATHS CORRESPONDING TO THIS DATA ARE NOT THE SAME. THE PROBLEM OF CONVERSION OF RANGE INFORMATION INTO CARTESIAN COORDINATE INFORMATION IS TREATED. THE TWO MOST COMMON MEASURES OF ERROR PROPAGATION AND A METHOD FOR FINDING THE POINTS OF INTERSECTION OF TWO CONICS ARE INCLUDED.

269 092   0241   (*DOPPLER TRACKING, SATELLITE VEHICLES, MATHEMATICAL AN ALYSIS, ANALYTIC GEOMETRY, EQUATIONS, MATRIX A LGEBRA.) (*SATELLITE VEHI CLE TRAJECTORIES, MATHEMATICAL ANALYSIS, STATISTICAL ANALYSIS, LEAST SQU ARES METHOD.) (ERRORS, PROPAGATION, ANALYSIS OF VARIANCE, DETERMINANTS.) -

269 095   0245   NUCLEAR MAGNETIC RESONANCE IN METALLIC SINGLE CRYSTALS,

269 095   0245   A METHOD FOR OBSERVING NUCLEAR RESONANCE ABSORPTION IN METALLIC SINGLE CRYSTALS IS REPORTED. THE THICK-SAMPLE METHOD DESCRIBED APPEARS TO BE APPLICABLE TO A WIDE VARIETY OF PURE METALS AND ALLOYS, IN SINGLE CRYSTAL OR POLYCRYSTALLINE FORM. IN CASES WHERE THE SIGNAL TO NOISE RATIO IS UNFAVORABLE, SIMPLE GEOMETRY APPLICATIONS ARE NOT ADEQUATE. HOWEVER, THE TOTAL SURFACE OF THE SAMPLE CAN BE INCREASED BY CUTTING SLOTS IN THE CRYSTAL OR BY STACKING SEVERAL THICK CRYSTALS. ANISOTROPIC EFFECTS IN SINGLE CRYSTALS OF NONCUBIC METALS WILL BE OF PARTICULAR INTEREST. PURE QUADRUPOLE RESONANCE AND RELAXATION TIME MEASUREMENTS ON SINGLE METALLIC CRYSTALS SHOULD ALSO BE POSSIBLE.

269 095   0242   (*METALLIC CRYSTALS, *SINGLE CRYSTALS, *METALS, *ALLOYS , CRYSTALS, *NUCLEAR MAGNETIC RESONANCE, HYSTERESIS, TEST METHODS.) -

269 110   0246   RESEARCH DIRECTED TOWARD DESIGN AND DEVELOPMENT OF EXPERIMENTAL DATA PROCESSING EQUIPMENT.

269 110   0246   DESIGN, DEVELOPMENT AND MODIFICATIONS ARE PRESENTED ON THE FOLLOWING COURSE GENERATOR UNIT, DIGITAL CIRCUIT ANALYZER, PUNCHED CARD DATA INSERTION, ANCILLARY DATA STORAGE AND DECODING, SUPPLEMENTARY DATA CONSOLE, DRUM STORAGE UNIT INSTALLATION AND CHECKOUT, CONSTANT LEVEL RECORDING AMPLIFIER, READOUT CAPABILITIES, X-H DISPLAY TECHNIQUES, RADAR SITE NUMBER INTENSIFICATION SELECTION, RAID SIZE MODIFICATION, SCALE FACTOR CONVERSION OF VELOCITY READOUTS, AND ELECTRONIC DISPLAY OF SITE LOCATION.

269 110   0243   (*DATA PROCESSING SYSTEMS, *LABORATORIES, DESIGN, RELIA BILITY, SIMULA-TION, APPLIED PSYCHOLOGY, HUMAN ENGINEERING.) (AERIAL REC ONNAISSANCE, AIR TRAFFIC CONTROL SYSTEMS, GROUND CONTROLLED INTERCEPTION SYS-TEMS, COMMAND SYSTEMS, CONTROL SYSTEMS, GUIDED MISSILE RESEARCH.)

269 112   0247   THE PROPERTIES OF CONDUCTION ELECTRONS IN ALKALI HALIDE CRYSTALS. II. A HARMONIC ANALYSIS OF THE ALTERNATING CURRENT SOLUTIONS OF THE EQUATION FOR MOTION OF MOBILE NEGATIVE CHARGE CARRIERS IN ADDITIVELY COLORED ALKALI HALIDE CRYSTALS,

269 112   0247   THE EQUATIONS OF MOTION FOR SPACE CHARGE LIMITED CARRIER DIFFUSION IN A TRAP FREE CRYSTAL ARE DISCUSSED. BOUNDARY CONDITIONS EQUIVALENT TO CURRENT BLOCKING ELECTRODES ARE INTRODUCED AND ONLY THE NEGATIVE CHARGE CARRIER IS ASSUMED MOBILE. A SINUSOIDAL VOLTAGE IS APPLIED TO THE CRYSTAL ELECTRODES AT + L/2, WHERE L IS THE CRYSTAL LENGTH. A GENERAL EXPRESSION FOR THE QTH HARMONIC OF THE SPACE

AVERAGE CURRENT AND THE NEGATIVE CHARGE CARRIER CONCENTRATION AT THE
ELECTRODE IS GIVEN. IT IS SHOWN THAT FOR A SINUSOIDAL APPLIED VOLTAGE
AND CURRENT BLOCKING ELECTRODES, THE FIELD AND CARRIER CONCENTRATIONS
HAVE A DEFINITE PARITY WHICH ALTERNATES WITH THE ORDER OF THE HARMONIC,
AND THE EVEN HARMONICS OF THE SPACE AVERAGE CURRENT ARE ZERO.
NUMERICAL SOLUTIONS OF THE CURRENT AND NEGATIVE CHARGE CARRIER
CONCENTRATION AT THE ELECTRODES SHOW THAT THE HARMONIC CONTENT AT LOW
FREQUENCIES (LESS THAN 100 CPS) IS VERY LARGE FOR AN APPLIED VOLTAGE
GREATER THAN KT/E. AT FREQUENCIES ABOVE APPROXIMATELY 100 CPS, THE
SO-CALLED SMALL SIGNAL LINEARIZED THEORY IS APPLICABLE.

269 112   0244   (*SEMICONDUCTORS, ELECTRONS, *CONDUCTIVITY, *ALKALI MET
AL COMPOUNDS, HAL-IDES, CRYSTALS.) (*HARMONIC ANALYSIS, ALTER-NATING CU
RRENT, EQUATIONS, MOTION FOR SPACE CHARGES, ELECTRON CHARGE, DIFFUSION,
DENSITY IN *POTASSIUM COMPOUNDS, *BROMIDES, COLOR CENTERS, LINEAR PROGRA
MMING.) SOLID STATE PHYSICS.   -
269 113   0248   SOLAR-FLARE RADIATION AND MANNED SPACE FLIGHT,

269 113   0248   SOLAR-FLARE EMISSION WILL BE THE DETERMINING FACTOR
IN SHIELD DESIGN FOR MANNED INTERPLANETARY VEHICLES. PRESENT KNOWLEDGE
OF SOLAR-FLARE CHARACTERISTICS IS INSUFFICIENT TO PERMIT AN ACCURATE
CALCULATION OF THE RADIATION DOSAGE TO BE EXPECTED IN SPACE. FLARES
OCCUR AT IRREGULAR INTERVALS, MAKING THEM DIFFICULT TO FORECAST
FURTHERMORE, THE INTENSITY AND DURATION VARY FROM ONE EVENT TO ANOTHER
IN AN UNDEFINED MANNER. THIS MEMORANDUM SUMMARIZES THE CURRENTLY KNOWN
FACTS ABOUT SOLAR FLARES, ILLUSTRATES SOME OF THE DIFFICULTIES IN
ACCURATELY DETERMINING SHIELD REQUIREMENTS, AND POINTS OUT THE AREAS IN
WHICH ADDITIONAL EXPERIMENTAL DATA WOULD BE OF GREATEST VALUE.

269 113   0245   (*SOLAR FLARES, *SPACE FLIGHT, MANNED, *RADIATION HAZAR
DS, *RADIATION IN-JURIES, MATHEMATICAL ANALYSIS.) (DOSE RATE, *SUNSPOT
S, SOLAR ENERGY, VAN ALLEN RADIATION BELT, COSMIC RAYS.)   -
269 122   0249   S WAVE STUDIES OF EARTHQUAKES OF THE NORTH PACIFIC.
PART I KAMCHATKA,

269 122   0249   THE POLARIZATION OF S WAVES AT STATIONS DISTRIBUTED
AZIMUTHALLY ABOUT THE SOURCE WAS EXAMINED FOR EACH OF 23 KAMCHATKA
EARTHQUAKES OF 19501960. IN 19 OF THESE EARTHQUAKES THE P AND S WAVE
DATA WERE IN AGREEMENT WITH A DOUBLE COUPLE SOURCE AS THE POINT MODEL
OF THE FOCAL MECHANISM. THE S WAVES INDICATE A UNIFORM MECHANISM WHICH
REPEATS ITSELF FROM EARTHQUAKE TO EARTHQUAKE AND FROM WHICH IT MAY BE
INFERRED THAT THE AXES OF GREATEST AND LEAST STRESS AT THE FOCI TEND TO
LIE IN A VERTICAL PLANE NORMAL TO THE TREND OF THE KAMCHATKA-KURILES
ARC. THE AXIS OF LEAST STRESS USUALLY PLUNGES ALMOST VERTICALLY UNDER
THE CONTINENT, BUT MAY ALSO PLUNGE LESS STEEPLY, AT ANGLES AS LOW AS 45
DEGREES. AT LEAST TWO EARTHQUAKES MAY BE REPRESENTED BY A SINGLE
COUPLE SOURCE.

269 122   0246   (EARTHQUAKES, *USSR.) (*SEISMIC WAVES, *POLARIZATION,
*DISTRIBUTION, SEISMIC STATIONS, STATISTICAL ANALYSIS, AZIMUTH, MAP PRO
JECTION.)   -
269 414   0252

269 414   0252   A STUDY IS PRESENTED OF STATIC AND DYNAMIC SOLAR
PANEL SYSTEMS FOR THE OPTIMUM CONVERSION OF SOLAR RADIATION TO
ELECTRICAL ENERGY. THE INFLUENCE OF SOLAR PANEL ORIENTATION ON ENERGY
COLLECTED IS ANALYZED TO DETERMINE THE PERCENTAGE CHANGE IN AVAILABLE
TOTAL SOLAR RADIATION OVER THE DAY PERIOD. PRELIMINARY PANEL
DRIVING-POWER REQUIREMENTS ARE ESTABLISHED FOR THE ASSUMED WIND
LOADING OF THE 20-SQ-FT PANEL. OPEN- AND CLOSED-LOOP ORIENTATION
SYSTEMS ARE INVESTIGATED AND RECOMMENDATIONS ARE GIVEN ACCORDING TO
WEIGHTING FACTORS. SOLID-STATE DETECTOR TECHNIQUES ARE ANALYZED AND
ORIENTATION SENSORS ARE EXAMINED FOR THEIR APPLICABILITY TO THE
OVER-ALL SYSTEM WITH REFERENCE TO PERFORMANCE, REQUIRED EQUIPMENT,
ACCURACY, AND COST. THE GEOMETRY OF THE WEDGE-TYPE ORIENTATION SENSOR
IS GIVEN WITH CURVES OF SENSITIVITY AND TOTAL SENSOR OUTPUT VERSUS
ROTATION FROM THE SUN LINE. A DESCRIPTION OF THE FIRST
FEASIBILITY-DEMONSTRATION MODEL OF THE WEDGE-TYPE ORIENTATION SENSOR
IS INCLUDED.

269 414   0249   (*SOLAR CELLS, *ELECTRIC POWER PRODUCTION, SOLAR ENERG
Y, THERMAL RADIATION, SUN, TRACKING, FOCUSING, DETECTORS, ROTATING STRUC
TURES, DESIGN, SENSITIVITY, TESTS.) (POWER SUPPLIES, FEASIBILITY STUDIES
.)   -
269 491   0254   NO TITLE AVAILABLE

269 491   0254   THE CLIMATOLOGICAL BEHAVIOR OF THE BALLISTIC WIND
AND DENSITY IS EXAMINED USING THE MEANS OF EQUALLY WEIGHTED VALUES OF
UPPER-AIR WIND AND DENSITY AT ALTITUDES 2 KM APART. THESE MEAN VALUES
ARE TERMED INTEGRATED WIND AND DENSITY, RESPECTIVELY. THREE INTEGRATED
VALUES OF WIND AND DENSITY ARE USED, ONE FOR THE ATMOSPHERE BELOW 12
KM, ANOTHER FOR THE ATMOSPHERE BELOW CHOSEN FROM WIDELY DIVERSE
CLIMATIC REGIMES, ARE EMPLOYED. THE SPECIFIC ASPECTS OF BEHAVIOR
EXAMINED ARE THE EFFECTS OF VARIABILITY ON SHORT-PERIOD MEANS
COMPARISON OF MONTHLY AND SEASONAL STATISTICS THE EFFECTS OF
RESTRICTED AMOUNTS OF DATA AND THE RELATION BETWEEN INTEGRATED DENSITY
AND INTEGRATED WIND.

269 491   0251   (*WIND, HIGH ALTITUDE, PERIODIC VARIATIONS, VELOCITY,
DIRECTION FINDING, ANALYSIS, VECTOR ANALYSIS.) (CLIMATIC FACTORS, GUID
ED MISSILE TRAJECTORIES.)   -
269 505   0256   DEVELOPMENT OF 2400 DEGREE F FORGING DIE SYSTEM.

269 505   0256   EFFORTS WERE CONTINUED ON EXTENDING HOT FORGING DIE
TECHNOLOGY TO REFRACTORY METALS. A HOT DIE SYSTEM TO EVALUATE THE
UPPER OPERATING TEMPERATURE LIMIT OF INCONEL 713 C FORGING DIES IS
READY FOR FORGING. REDESIGNED DIES ARE PARTIALLY PREPARED TO USE A HOT
DIE EXTRUSION - FORGING PROCESS TO MINIMIZE THE FORGING SEQUENCE.
HIGHTEMPERATURE PROPERTIES OF METALLIC, INTERMETALLIC AND NONMETALLIC
MATERIALS ARE BEING DETERMINED TO ASSESS THEIR UTILITY AS 2400 F
FORGING DIES. (AUTHOR) AD-269 5059N6

269 505   0253   (*FORGING, *DIES FOR MOLYBDENUM ALLOYS, REFRACTORY MATE
RIALS, METALS, CERAMIC MATERIALS, INTERMETALLIC COMPOUNDS, CERMETS, DESI
GN.) (MANUFACTURING METHODS, *EXTRUSION, HIGH TEMPERATURE RESEARCH, PLAS
TIC FLOW, 9 PRODUCTION, AIRFRAMES, GUIDED MISSILES.) (DIES, MATERIALS, H
EAT RESISTANT ALLOYS, COATINGS, METAL COATINGS.)   -

269 514   0257   DETERMINATION AND ANALYSIS OF THE POTENTIALITIES OF
THERMAL ENERGY STORAGE MATERIALS.

269 514   0257   EXTENSIVE TESTS WERE CONDUCTED TO FIND A METAL
SUITABLE AS A CONTAINER FOR MOLTEN LIBO2 AT 1600 F. TEST RESULTS
INDICATED AN INCREASING CORROSION RESISTANCE WITH INCREASING CR CONTENT
WITH ALLOYS CONTAINING A HIGH PERCENTAGE OF CR. DROP-CALORIMETRIC
MEASUREMENTS ON CASI2 PRODUCED HEAT CONTENT DATA TO 470 C. THE THERMAL
CONDUCTIVITY APPARATUS WAS MODIFIED. MEASUREMENTS MATE THERMAL
CONDUCTIVITY VALUE OF 5.7 BTU/HR SQ FT F/FT WAS OBTAINED. CONSTRUCTION
OF THE FURNACE-CALORIMETER APPARATUS FOR MEASUREMENT OF HEAT RELEASE
RATES WAS COMPLETED EXCEPT FOR THE NI CALORIMETER BLOCK.

269 514   0254   (*MATERIALS, HIGH TEMPERATURE RESEARCH, STORAGE, THERMO
DYNAMICS, HEAT OF FUSION, THERMAL CONDUCTIVITY, ENERGY, SPECIFIC HEAT, A
NALYSIS.) (*CONTAINERS, *CRUCIBLES, ALLOYS, ADDITIVES, CHROMIUM, LIQUID
S, MELTING, *LITHIUM COMPOUNDS, *BORATES, CORROSION INHIBITION.) (*CALC
IUM COMPOUNDS, SILICIDES, *SODIUM COMPOUNDS, FLUORIDES.) (LABORATORY EQ
UIPMENT, *CALORIMETERS, *LABORATORY FURNACES, TESTS.)   –

NO TITLE AVAILABLE

NO ABSTRACT AVAILABLE
269 517   0256   (*RE-ENTRY VEHICLES, *ATMOSPHERE ENTRY, RE-ENTRY AERODY
NAMICS, STABILITY, SIMULATION BY JET PLANES, JET TRAINING PLANES.) (PILO
TS, HUMAN ENGINEERING, HANDLING, CONTROL SYSTEMS, FLIGHT TESTING.)   –
269 526   0260   GRAPHIC DETERMINATION OF COEFFICIENTS OF PART AND
MULTIPLE CORRELATION IN THREE-VARIABLE PROBLEMS,

269 526   0260   ON MANY OCCASIONS IT IS CONVENIENT TO SOLVE
EQUATIONS GRAPHICALLY RATHER THAN ALGEBRAICALLY. A CONVENIENT MEANS
FOR GRAPHICALLY DETERMINING THE VALUES OF COEFFICIENTS OF PART
CORRELATION, COEFFICIENTS OF MULTIPLE CORRELATION, AND BETA WEIGHTS FOR
THREE-VARIABLE PROBLEMS IS PRESENTED.   •

269 526   0258   (ALGEBRA, *PROJECTIVE GEOMETRY, *NUMERICAL ANALYSIS.)

269 527   0261   DEVELOPMENT OF THE AIR FORCE PRECOMMISSION SCREENING
TEST-62,

269 527   0261   THE 1962 REVISION OF THE AIR FORCE PRECOMMISSION
SCREENING TEST REPLACES AN EARLIER FORM FOR SCREENING OF APPLICANTS
FOR NAVIGATOR TRAINING AND SELECTION OF AIRMEN FOR THE AIR FORCE
ACADEMY PREPARATORY SCHOOL. SECTIONS OF THE TEST WERE CONSTRUCTED AS
SHORT EQUIVALENT FORMS OF FIVE PARTS OF THE AIR FORCE OFFICER
QUALIFYING TEST VERBAL, QUANTITATIV̈, GENERAL SCIENCE, MECHANICAL,
AND SCALE READING. RESULTS OF A TRYOUT OF THE NEW TEST WITH A
HIGH-APTITUDE SAMPLE OF BASIC AIRMEN DEMONSTRATED A SUITABLE
DISTRIBUTION OF SCORES AND HIGH CORRELATIONS BETWEEN CORRESPONDING
PARTS OF THE NEW TEST AND AFOQT.

269 527   0259   (*AVIATION PERSONNEL, *NAVIGA-TORS, SELECTION, TRAINING
•.) (*APTITUDE TESTS, DESIGN.) STATISTICAL ANALYSIS.   –
269 541   0262   ANALYSIS OF STRUCTURAL LAMINATES.

269 541   0262   A GENERAL SMALL-DEFLECTION THEORY GOVERNING THE
ELASTOSTATIC EXTENSION AND FLEXURE OF THIN LAMINATED ANISOTROPIC SHELLS
AND PLATES IS FORMULATED. THE PLATE OR SHELL STRUCTURE MAY LAYERS,
EACH OF WHICH MAY POSSESS DIFFERENT THICKNESS, ORIENTATION, AND/OR
ORTHOTROPIC ELASTIC PROPERTIES. DONNELL-TYPE EQUATIONS FOR CYLINDRICAL
SHELLS AND POISSON-KIRCHHOFF PLATE EQUATIONS ARE EXPLICITLY DISCUSSED,
ALONG WITH PROCEDURES FOR DETERMINING STRESSES IN AN INDIVIDUAL
LAMINA. SEVERAL METHODS OF SOLUTION OF THE SYSTEM OF EQUATIONS
GOVERNING EXTENSION AND FLEXURE OF PLATES ARE DISCUSSED AND ILLUSTRATED
WITH EXAMPLES. OPTIMIZATION OF LAMINATE CONFIGURATION IS TREATED
BRIEFLY. THE RESULTS OF A LIMITED NUMBER OF CRACK PROPAGATION TESTS OF
FLAT PLATE ALUMINUM FOIL LAMINATES IN UNIAXIAL TENSION ARE PRESENTED.

269 541   0260   (STRUCTURAL SHELLS, *ELASTIC SHELLS, DEFORMATION, DEFLE
CTION, STRESSES.) SHELLS, MECHANICAL PROPERTIES.) (*LAMINATES, ALUMINUM
.)   -
269 542   0263   FERRIELECTRICS AS A POSSIBLE COMPUTER ELEMENT,

269 542   0263   RESEARCH ON HIGH TEMPERATURE FERROELECTRIC STORAGE
MEDIA LED TO THE DISCOVERY OF A CLASS OF FERROELECTRIC MATERIALS WHICH
REQUIRE A MINIMUM THRESHOLD FIELD FOR SWITCHING. THIS PROPERTY WAS
TRICS AND COMPARES WITH SIMILAR PROPERTIES FOUND TO EXPLOIT THE
PHENOMENON OF FERRIELECTRICITY FOR APPLICATION IN COMPUTER LOGICAL
DEVICES. THE FEASIBILITY OF PREPARING CAPACITORS HAVING A LIMITING
ELECTRICAL PARAMETERS OF THE DEVICE WERE DETERMINED. FINALLY, A NOVEL
NON-DESTRUCTIVE READOUT METHOD WAS INVESTIGATED USING ELECTROMAGNETIC
INTERFEROMETER TECHNIQUES. WITH THE EXTO-NOISE RATIO OBTAINED WAS 61.
IT IS POSSIBLE TO OBTAIN MILLIONS OF READOUTS FROM A FERROOF
POLARIZATION OF THE FERROELECTRIC CAPACITOR.

269 542   0261   (*FERROELECTRIC MATERIALS, ELECTRICAL PROPERTIES, HIGH
TEMPERATURE RE-SEARCH, SWITCHING CIRCUITS.) (COMPUTER LOGIC, TESTS, NON
-DESTRUCTIVE TESTING, POLARIZATION, *DIGITAL COMPUTERS, *MEMORY DEVICES.
)   -
269 543   0264   NO TITLE AVAILABLE

269 543   0264   THE MACROSCOPIC EQUATIONS OF TRANSPORT ARE
SPECIALIZED TO AN IDEAL, INVISCID, NON-DIFFUSING GAS. THESE EQUATIONS
ARE USED AS A MODEL FOR DESCRIBING PLANE OR AXIALLY SYMMETRIC,
CHEMICALLY REACTING HYPERSONIC FLOW FIELDS. DETAILED NUMERICAL
SOLUTIONS ARE OBTAINED BY USING FINITE DIFFERENCE PROCEDURES AND THE
IBM-704 AND -7090 DIGITAL COMPUTERS. A DESCRIPTION OF THE COMPUTER
CODE, THE RESULTS OF A TRIAL RUN, AND SOME EXPERIENCES WITH THE USE OF
THE PROGRAM, ARE PRESENTED.

269 543   0262   (*HYPERSONIC FLOW, *CHEMICAL REACTIONS, TRANSPORT PROPE
RTIES, GAS FLOW) (THERMODYNAMICS, HYDRODYNAMICS, DISSOCIATION.) (*EQUATI
ONS OF STATE, PARTIAL DIFFERENTIAL EQUATIONS, COMPLEX VARIABLES.) (COMP
UTERS.)   -
269 547   0265   KINEMATIC AND TESSELLATION MODELS OF SELF-REPAIR,

269 547   0265   KINEMATIC MODELS, SELF-REPAIR, TESSELLATION. THE
CONCEPT OF SELF-REPAIR IS STUDIED IN TERMS OF AUTOMATA THEORY.
DIFFERENT CLASSES OF AUTOLOCALIZED AUTOMATA, ARE CONSIDERED. THE PARTS
(COMPONENTS) OF THE AUTOMATA ARE UNIFORMLY EXPOSED TO ERRORS. IT IS
SHOWN THAT IF AN AUTOMATON OF A CERTAIN CLASS HAS A LIFE-SPAN, NOT

EXCEEDED BY ANY OTHER AUTOMATON OF THE CLASS, THEN IT MUST CONTAIN A
REPAIRING MECHANISM. SUCH AUTOMATA CAN BE SAID TO BE SELF-REPAIRING
WITH RESPECT TO THE CLASS. A DEFINITION OF SELFREPAIR IS SUGGESTED.
IT IS FOUND THAT A SELFREPAIRING SYSTEM, WHICH IS WELL-LOCALIZED WITH
RESPECT TO ITS INPUTS AND OUTPUTS, HAS A FINITE SPAN WE OBSERVE IN
NATURE FOR ANY ANIMAL OR FOR ANY WELL-LOCALIZED MACHINE. ON THE OTHER
HAND, IF WE RELAX THE CONDITION THAT THE AUTOMATON BE WELL-LOCALIZED,
THEN INFINITE LIFE-SPANS CAN BE OBTAINED. SUCH AUTOMATA HAVE ALSO
SELF-REPRODUCING PROPERTIES AND WE OBTAIN HERE A CONNECTION BETWEEN THE
CONCEPTS OF SELF-REPAIR AND SELFREPRODUCTION. THESE SELF-REPAIRING
AUTOMATA ARE IN A WAY SIMILAR TO GROWING BIOLOGICAL SOCIETIES WITH
LOOSELY SPECIFIED INTERNAL STRUCTURES.

269 547   0263   (*AUTOMATION, THEORY, *META-MATHEMATICS.)   (ELECTRICAL
NETWORKS, *CYBERNET-ICS, ERRORS, LIFE EXPECTANCY, RELIABILITY.) (COMBINA
TORIAL ANALYSIS, SAMPLING, PROBABILITY, STATISTICAL PROCESSES, TAYLOR S
SERIES, MATRIX ALGEBRA, INTEGRAL EQUATIONS.)   PROBABILITY, QUANTUM MECHA
NICS.   -
269 228   0288   BIBLIOGRAPHY OF RESEARCH AND DEVELOPMENT REPORTS
9REVISION NO. 5).

269 228   0288   NO ABSTRACT AVAILABLE

269 228   0286   (*GUIDED MISSILES, SURFACE TO SURFACE, *BIBLIOGRAPHY.)
(*GUIDED MISSILE RESEARCH, SCIENTIFIC REPORTS.)   -
269 229   0289   HIG-4 SPIN-MOTOR ROTATION DETECTOR DEVELOPMENT AND
QUALIFICATION PROGRAM. VOLUME I.

269 229   0289   THE RESULTS ARE SUMMARIZED OF THE MODIFICATION AND
SUBSEQUENT TEST PROGRAM DIRECTED TOWARD THE INCORPORATION OF A
SPIN-MOTOR ROTATION MONITORING DEVICE IN THE HIG-4 GYRO. THE
MODIFICATION CONSISTS PRIMARILY OF INCLUSION OF A VARIABLE RELUCTANCE
SIGNAL PICKOFF WITHIN THE GYRO GIMBAL   (OR FLOAT). THE PICKOFF IS
DESIGNED TO DEVELOP TWO VOLTAGE PULSES PER REVOLUTION OF THE MOTOR
WHEEL. THUS, AT A MOTOR SPEED OF 400 REVOLUTIONS PER SECOND, A SIGNAL
OF 800 PULSES PER SECOND IS GENERATED. THE DURATION AND PEAK-TO-PEAK
AMPLITUDE OF EACH PULSE ARE APPROXIMATELY 0.4 MILLISECOND AND 0.2 VOLT,
RESPECTIVELY, ACROSS A 600-OHM LOAD RESISTANCE. GYROS INCORPORATING
THESE DESIGN CHANGES WERE EXPOSED TO HIGH AND LOW TEMPERATURE, SHOCK,
VIBRATION, AND ACCELERATION QUALIFICATION TESTS. PICKOFF PERFORMANCE
WAS UNAFFECTED BY THESE ENVIRONMENTS.

269 229   0287   (*GYROSCOPES, *SIGNAL GENERATORS, MONITORS, ROTATION, S
PIN, DETECTORS, MAGNETS, DESIGN, TEMPERATURE, SHOCK RESISTANCE, VIBRA-TI
ON, ACCELERATION, TESTS, RELIABILITY.)   -
269 231   0290   NUTRITION AND CIRRHOSIS OF THE LIVER.

269 231   0290   REGENERATION OF THE LIVER AND IRON DISEASES OF THE
LIVER WERE STUDIED, PRINCIPALLY USING RADIOISOTOPE AND AUTORADIOGRAPHIC
TECHNIQUES. (1) A SEARCH WAS MADE FOR A POSSIBLE HUMORAL FACTOR IN THE
BLOOD OF RATS THAT CONTROLS REGENERATION OF THE LIVER AFTER PARTIAL
HEPATECTOMY. (2) OBSTRUCTION OF THE COMMON BILE DUCT OF THE RAT WAS
FOUND TO RESULT IN REGENERATION OF LIVER CELLS COMPARABLE IN NUMBER TO
THAT SEEN APPROXIMATELY 48 HOURS AFTER PARTIAL HEPATECTOMY IN ADDITION
TO WELL KNOWN CHANGES IN BILE DUCTS. (3) IN EXPERIMENTAL CARCINOMA OF
THE LIVER PRODUCED BY FEEDING A BUTTER YELLOW DERIVATIVE, AN INCREASED
REGENERATION OF LEVER CELLS DID NOT PRECEDE THE OCCURRENCE OF TUMORS.

(4) REGENERATION OF THE CIRRHOTIC LIVER PRODUCED BY DIETARY MEANS WAS COMPARED WITH REGENERATION OF NORMAL RAT LIVER, IN BOTH CASES FOLLOWING PARTIAL HEPATECTOMY. CIRRHOTIC LIVER RESPONDED AT THE SAME TIMES AND TO THE SAME EXTENT AS NORMAL LIVER.

269 231   0288   (*LIVER, PATHOLOGY, *NUTRITION, *DISEASES, REGENERATION , SURGERY.) RADIOAC-TIVE ISOTOPES, AUTORADIOGRAPHY, *MEDICAL RESEARCH.

269 234   0291   THEORETICAL PREDICTION OF PLASTIC STRAINS OF POLYCRYSTALS,

269 234   0291   PLASTIC STRAIN IS CONSIDERED A CONSEQUENCE OF SLIPPING ON SOME OF THE 12 SLIP SYSTEMS OF FACECENTERED-CUBIC SINGLE CRYSTALS. THE POLYCRYSTAL IS ASSUMED TO BE MACROSCOPICALLY HOMOGENEOUS AND INITIALLY ISOTROPIC -- THAT IS, THE CRYSTAL ORIENTATIONS, SIZES, SHAPES AND LOCATIONS ARE RANDOM AND UNCORRELATED. THE ROTATIONS OF THE GRAINS DURING DEFORMATION ARE NEGLECTED, AND THE AVERAGE PLASTIC STRAIN IN GRAINS OF A GIVEN ORIENTATION IS CALCULATED ON THE BASIS OF THE ASSUMPTION THAT THE GRAINS UNDER CONSIDERATION ARE SPHERICAL AND ELASTICALLY ISOTROPIC.

269 234   0289   (STRESSES, DEFORMATION, CRYSTALS, ELASTICITY, *PLASTICI TY, CRYSTAL STRUCTURE, *SHEAR STRESSES, GRAINS (METALLURGY).) (TEN-SILE PROPERTIES, TENSOR ANALYSIS, TRANSFORMA-TIONS (MATHEMATICS), INTEGRALS, INTEGRAL EQUA-TIONS, THEORY.) *TABLES.   -
269 237   0292   STRAIN AGING IN MOLYBDENUM.

269 237   0292   A STUDY OF THE CHARACTERISTICS OF STRAIN AGING IN COMMERCIAL-PURITY MO BY THE METHODS OF DYNAMIC MODULUS RECOVERY AND YIELD POINT RETURN, AND A DETERMINATION OF THE ACTIVATION ENERGY OF STRAIN AGING WAS MADE. MODULUS SPECIMENS, FROM ARC-CAST, RECRYSTALLIZED MO, IN THE SHAPE OF RECTANGULAR BARS WERE DEFORMED 3$ IN COMPRESSION. THE RETURN OF YOUNG'S MODULUS WAS INVESTIGATED AS A FUNCTION OF AGING TIME AND TEMPERATURE. MEASUREMENTS OF RESONANT FREQUENCY WERE MADE AT ROOM TEMPERATURE. THE RATE OF INCREASE OF THE SQUARE OF RESONANT FREQUENCY, RATHER THAN MODULUS RECOVERY WAS USED TO PLOT THE DATA FOR DETERMINING AN ACTIVATION ENERGY. TENSILE SPECIMENS FROM POWDER-METALLURGY MO SHEET WERE GIVEN 2$ PLASTIC DEFORMATION BY STRAINING TO THE END OF THE LOWER YIELD STRESS. THE RATE OF RETURN OF YIELD POINT WITH AGING TIME AND TEMPERATURE WAS PLOTTED. THE RATE OF YOUNG'S MODULUS RECOVERY GAVE VALUES OF ACTIVATION ENERGY FROM 24,000 TO 28,000 CAL/MOL. THE RATE OF YIELD POINT RETURN GAVE A SINGLE VALUE OF 24,000 CAL/MOL.

269 237   0290   (*MOLYBDENUM, CRYSTALS, CRYSTAL STRUCTURE, AGING IN LIQ UID METALS, DEFORMA-TION, MEASUREMENT, TENSILE PROPERTIES, ELASTICITY, TEST METHODS.)   -
269 238   0293   SURVEY AND ANALYSIS OF HYPERSONIC AND RE-ENTRY VEHICLES.

269 238   0293   A SURVEY AND ANALYSIS WAS MADE OF THE AEROTHERMODYNAMIC PROBLEM AREAS IN THE FLIGHT SPECTRUM OF HYPERSONIC GLIDE AND RE-ENTRY VEHICLES. THIS FLIGHT SPECTRUM WAS DEFINED BY SPEEDS BETWEEN 5000 FT/SEC AND ORBITAL SPEED AND BY ALTITUDES BETWEEN 100,000 AND 400,000 FEET. MAJOR PROBLEM AREAS OF FLIGHT WITHIN THIS SPECTRUM WERE ANALYZED TO DETERMINE THE COVERAGE OF EXISTING DATA AND TO RECOMMEND AREAS WHERE FURTHER RESEARCH IS NEEDED.

269 238   0291   (*RE-ENTRY VEHICLES, *HYPER-VELOCITY VEHICLES, FLIGHT P
ATHS, SHOCK WAVES, RE-ENTRY AERODYNAMICS, SUPERAERODYNAMICS, *HYPERSONIC
S, ABLATION, BOUNDARY LAYER, *AERODYNAMIC HEATING, FRICTION, HEAT TRANSF
ER, LIFT, DRAG, PRESSURE, THEORY, MATHEMATICAL ANALYSIS.) *BIBLIOGRAPHY
.

269 241   0294   HIGH-CAPACITY TELEMETRY DIGITIZER AND VIBRATION
ANALYZER. SUB-SYSTEM B.

269 241   0294   A TELEMETRY DIGITIZING SYSTEM IS DESCRIBED WHICH
ACCEPTS POSTFLIGHT ANALOG DATA AND CONVERTS THE INFORMATION INTO
DIGITAL FORM COMPATIBLE WITH EXISTING DATA-HANDLING EQUIPMENT. THE
DIGITAL DATA IS THEN STORED ON MAGNETIC TAPE, ALONG WITH TIMING
INFORMATION, MULTIPLEXER CHANNEL NUMBER, AND AN IDENTIFICATION CODE
NUMBER. CONTROL AND PROGRAMMING CIRCUITRY, IN CONJUNCTION WITH PATCH
PANEL, PROVIDES THE LOGIC ELEMENTS WHICH INTEGRATE TIMING, ANALOG, AND
DIGITAL SECTIONS INTO A FUNCTIONAL SYSTEM.

269 241   0292   (*ANALOG TO DIGITAL CONVERTERS, *DATA PROCESSING SYSTEM
S, DIGITAL COMPUTERS, *TELEMETERING DATA, MULTIPLEX TRANSMISSION, ELECTR
ONIC CIRCUITS, PROGRAMMING, MAINTENANCE, INSTRUCTION MANUALS.) (GUIDED
MISSILE TRACKING SYSTEMS, TELEMETER SYSTEMS, MATHEMATI-CAL COMPUTER DAT
A, DIGITAL SYSTEMS, DATA STORAGE SYSTEMS, COMPUTER LOGIC, DESIGN.)   —
269 242   0295   HOT GAS SERVOMECHANISM THEORY AND TECHNOLOGY AN
ANNOTATED BIBLIOGRAPHY,

269 242   0295   A SELECTED LIST OF ANNOTATED REFERENCES IS PRESENTED
ON HOT GAS SERVOMECHANISMS INCLUDING DESIGN, ANALYSIS, COMPONENTS, AND
EXPERIENCE. SOME REFERENCES ARE TO CLASSIFIED REPORTS WITH
UNCLASSIFIED TITLES, AND THESE ARE NOT ANNOTATED SO THAT THIS
BIBLIOGRAPHY MAY BE MORE WIDELY CIRCULATED. SELECTED ITEMS IN RELATED
AREAS, SUCH AS PNEUMATICS, ARE INCLUDED.

269 242   0293   (*BIBLIOGRAPHY, *SERVOMECHA-NISMS, SERVO SYSTEMS, *PNEU
MATIC SERVO-MECHANISMS, PNEUMATIC SYSTEMS, GAS GENERAT-ING SYSTEMS.)
—

269 246   0296   MOBILITY ENVIRONMENT INVESTIGATION PROGRAM, VOLUME
9.

269 246   0296   THIS REPORT INCLUDES DETAILED TEST PLAN FOR THE
VIBRATION TEST OF A SECOND-STAGE MINUTEMAN ENGINE, APPENDIX. 10 MAY
61, 19P. TABLE. A CRITICAL FACTOR IN THE MOBILE MINUTEMAN PROGRAM IS
THE ABILITY OF THE MISSILE AND ITS SEPARATE STAGES TO WITHSTAND
IN-TRANSIT VIBRATION AND SHOCK. DURING TESTS, THE ENGINE AND
INDIVIDUAL COMPONENTS WILL BE SUBJECTED TO SIMULATED ENVIRONMENTAL
CONDITIONS OF VIBRATION AND SHOCK. ANALYTICAL STUIDES WILL BE MADE OF
GRAIN INTEGRITY AND THE EFFECTS OF LONGITUDINAL, TRANSVERSE, AND RADIAL
DYNAMIC LOADS ON THE ENGINE. THE TESTING PROGRAM WILL PROVIDE DATA FOR
ENSURING THE DURABILITY OF THE ENGINE DURING TRANSPORT.

269 246   0294   (*GUIDED MISSILES, SURFACE TO SURFACE, CARGO VEHICLES,
RAILROADS, *TRANS-PORTATION, ROCKET MOTORS, MOBILE, SOLID ROCKET PROPELL
ANTS, VIBRATION, SHOCK RESIST-ANCE, STRESSES, TENSILE PROPERTIES, TESTS,
TEST METHODS.) PROPELLANT GRAINS, MECHANICAL PROPERTIES.   —

269 248   0297   ADEPT - AN AUTOMATIC DATA EXTRACTOR AND PLOTTING
TABLE FOR HIGH SPEED REPETITIVE ANALOG COMPUTATION,

269 248   0297   AN INSTRUMENT CALLED ADEPT, AN AUTOMATIC DATA
EXTRACTOR AND PLOTTING TABLE, IS DESCRIBED. THE

269 248   0295   (*ANALOG COMPUTERS, ELECTRONIC CIRCUITS, *DATA PROCESSI
NG SYSTEMS, DESIGN, OPERATION.)   -
269 253   0298   AN ANALYTICAL INVESTIGATION OF FLIGHT CONTROL
PROBLEMS AND STATIC AND DYNAMIC RESPONSE REQUIREMENTS OF A HIGH-SPEED,
LOW-ALTITUTE MISSILE.

269 253   0298   THE RESULTS OF A STUDY OF THE FLIGHT CONTROL
PROBLEMS OF A HIGH-SPEED, LOW-ALTITUDE MISSILE ARE PRESENTED.
INVESTIGATIONS WERE ALSO MADE IN THE AREAS OF GUST ANALYSIS REACTOR,
INLET, AND CONTROL SYSTEM COUPLING AND BASIC VEHICLE STABILITY AND
CONTROL. THE EFFECTS OF SAMPLING FREQUENCY (DATA RATE), COMPUTATION
TIME DELAY, AND TRANSPORT LAGS ON OVER-ALL SYSTEM PERFORMANCE ARE
PRESENTED.

269 253   0296   (*DIGITAL SYSTEMS FOR FLIGHT, *CONTROL OF *GUIDED MISSI
LES.) (SYNTHESIS, CIRCUITS, *DIGITAL SYSTEMS.) (DIGITAL COM-PUTERS, AN
ALOG COMPUTERS, OPERATION.)   (SIMULATION OF EQUATIONS OF MOTION ON ANAL
OG COMPUTERS.) (MATHEMATICAL ANALYSIS OF AERO-DYNAMIC DATA FOR LAUNCHIN
G OF GUIDED MISSILES.) (*CONTROL SYSTEMS, GUIDANCE, RELIABILITY.) (NUCL
EAR PROPULSION, GUIDED MISSILES.)   -
269 254   0299   A VARIATIONAL PRINCIPLE SIMPLIFIED,

269 254   0299   THIS REPORT COMPILES EXISTING MATERIAL ON THE
VARIATIONAL METHOD IN ELECTROMAGNETIC SCATTERING PROBLEMS, TO PRESENT
IT IN A FORM READILY DIGESTED BY THOSE HAVING REASONABLY GOOD TRAINING
IN ADVANCED CALCULUS AND AN ELEMENTARY KNOWLEDGE OF MAXWELL'S
EQUATIONS. THE FIRST PART OF THE REPORT DISCUSSES THE MATHEMATICAL
TOOLS NEEDED TO DEVELOP THE VARIATIONAL FORMULA. THESE ARE CALCULUS OF
VARIATIONS, GREEN'S FUNCTION FOR THE SCALAR HELMHOLTZ EQUATION, AND
TENSOR ANALYSIS. THE SECOND PART APPLIES THESE IDEAS TO DERIVE THE
DYADIC GREEN'S FUNCTION AND AN INTEGRAL EQUATION FOR THE SCATTERED
FIELD. FROM THE INTEGRAL EQUATION, A STATIONARY EXPRESSION FOR THE
SCATTERED FIELD IS DERIVED, AND THE VARIATIONAL FORMULA FOR THE
BACKSCATTERING CROSS SECTION IS THEN OBTAINED.

269 254   0297   (ELECTROMAGNETIC WAVES, PROPAGATION, *SCATTERING, MATH
EMATICAL ANALY-SIS.) (*CALCULUS OF VARIATIONS, GREEN S FUNCTION, INTEG
RAL EQUATIONS.) TENSOR ANALYSIS.   -
269 256   0300   PRODUCTION ENGINEERING OF PLASTIC COMPONENTS FOR
CARTRIDGE, 81MM, ILLUMINATING, T214E2.

269 256   0300   NO ABSTRACT AVAILABLE

269 256   0298   (*ILLUMINATING PROJECTILES, *CARTRIDGES, ROCKET ASSIST
ED PROJECTILES, PLASTICS, PRODUCTION, MANUFACTURING METHODS.) (ROCKET MO
TORS, PROPELLANTS, SPECIFIC IMPULSE.)   -
269 259   0301   TRANSIENTS IN CERTAIN AUTONOMOUS MULTIPLE DEGREE OF
FREEDOM NONLINEAR VIBRATING SYSTEMS.

269 259   0301   OSCILLATIONS OF WEAKLY NONLINEAR AUTONOMOUS MULTIPLE
DEGREE OF FREEDOM DYNAMICAL SYSTEMS ARE STUDIED. THE ANALYSIS INCLUDES
NONLINEAR EFFECTS ARISING FROM THE POTENTIAL AS WELL AS THE KINETIC
ENERGIES OF THE SYSTEMS AND THE SYSTEMS INCLUDE ELEMENTS THAT PRODUCE
NONLINEAR DISSIPATIVE FORCES. THE METHOD OF AVERAGING IS APPLIED TO A
SUITABLY TRANSFORMED SET OF EQUATIONS. IN SEVERAL IMPORTANT CASES
NONPERIODIC SOLUTIONS FOR ARBITRARY INITIAL CONDITIONS ARE OBTAINED BY
QUADRATURES.

269 259   0299   (DYNAMICS, OSCILLATION, *VIBRA-TION, ANALYSIS.)   (POTEN
TIAL THEORY, RESONANCE, FREQUENCY, DAMPING, THEORY.) (*HARMONIC ANALYS
IS, POLYNOMIALS, *MATRIX ALGEBRA, FOURIER ANALYSIS, DIFFERENTIAL EQUATIO
NS, INTEGRATION, FUNCTIONS, *NON-LINEAR DIFFERENTIAL EQUATIONS.)   -
269 260   0302   EXPERIMENTAL STUDIES OF CAVITATION NOISE IN A
FREE-JET TUNNEL,

269 260   0302   THE RESULTS OF EXPERIMENTAL STUDIES ON CAVITATION
NOISE GENERATED IN THE FREE-JET TUNNEL AT   ST. ANTHONY FALLS HYDRAULIC
LABORATORY IN THE PERIOD OCTOBER 1960 TO JUNE 1961 ARE SUMMARIZED.
TWO-DIMENSIONAL TEST BODIES OF DIFFERENT SHAPES, SUCH AS A CIRCULAR
CYLINDER, WEDGE, AND A TULIN-BURKHART HYDROFOIL WERE TESTED. VARIOUS
TYPES OF CAVITATING FLOWS, NAMELY, TRANSIENT CAVITIES, STEADY-STATE
CAVITIES, AND NON-STATIONARY CAVITIES WERE COVERED. SPECIAL ATTENTION
HAS GIVEN TO THE EFFECT OF VENTILATION ON THE INTENSITY OF CAVITATION
NOISE. EFFECTS OF BODY SIZE AND THE PRESENCE OF A SOLID BOUNDARY WERE
ALSO INVESTIGATED.

269 260   0300   (*CAVITATION NOISE, ACOUSTICS, *CAVITATION, JETS, *WATE
R TUNNELS, GASES.) (TEST EQUIPMENT, CYLINDRICAL BODIES, CRYSTALS, BARIUM
 COMPOUNDS, TITANATES, TRANSDUCERS, OSCILLOGRAPHS, ULTRASONIC SPECTRUM
ANALYZERS, CATHODE RAY TUBE SCREENS.) (PHYSICAL PROP-ERTIES, VELOCITY,
PRESSURE, TEMPERATURE.)   (HARMONIC ANALYSIS, EXPERIMENTAL DATA.)   -
269 262   0303   REPORT OF THE SUBPANEL ON CONSOLIDATION AND
FABRICATION REFRACTORY METALS SHEET ROLLING PANEL.

269 262   0303   THE REPORT RECAPITULATES THE HIGHLIGHTS FROM THREE
MEETINGS CONCERNED WITH CONSOLIDATION, HOT WORKING, AND WARM-COLD
FINISHING. DISCUSSIONS WERE NOT CONFINED TO ANY ONE REFRACTORY METAL,
NOR DID THEY IN EACH CASE EXTEND TO ALL OF THE .MATERIALS BEING
PRODUCED. IT IS APPARENT THAT SOME PROBLEM AREAS ARE PECULIAR TO ONE
OR OTHER REFRACTORY ALLOY WHILE OTHER PROBLEM AREAS ARE COMMON IN
VARYING DEGREE TO ALL. AN ATTEMPT WAS MADE TO CATALOGUE THE FACTORS
WHICH BEAR UPON THE INITIAL HOT WORKABILITY OF SINTERED W SHEET BAR
WITH PHYSICAL ATTRIBUTES INCLUDING (1) A MINIMUM SINTERED DENSITY OF
90$. (2) A MEDIUM GRAIN SIZE, ASTM 6 TO 8 (TOO FINE A GRAIN SIZE
REQUIRES HIGH FLOW PRESSURE AND HAS A LIKELIHOOD OF BRITTLENESS A
COARSE GRAIN LEADS TO A HIGH UNIT GRAIN BOUNDARY AREA SEGREGATION OF
IMPURITIES), 93) A PORE DISTRIBUTION AND SIZE ADEQUATE TO INHIBIT GRAIN
COARSENING, AND (4) A REDUCED LEVEL OF INTERSTITIAL IMPURITIES.
(AUTHOR) AD-269 2629N6

269 262   0301   (*REFRACTORY MATERIALS, *METAL PLATES, SHEETS, MANUFAC
TURING METHODS, PROC-ESSING, POWDER METALLURGY, *TUNGSTEN, IM-PURITIES,
MELTING, ELECTRIC ARCS, ELECTRON BEAMS, CASTING, ROLLING MILLS, MACHININ
G, LATHES.) CONFERENCES.   -

269 266   0304   A MEDIATION MODEL FOR PAIRED-ASSOCIATE LEARNING,

269 266   0304   A MODEL TO EXPLAIN HOW PAIRED-ASSOCIATES GET LEARNED
HAS BEEN PRESENTED. IT WAS PROPOSED THAT PAIRED-ASSOCIATE LEARNING
MAY INVOLVE AS MANY AS FIVE INTERDEPENDENT PROCESSES CORRESPONDING TO
STIMULUS-TERM DISCRIMINATION, RESPONSE-TERM DISCRIMINATION, RESPONSE
LEARNING (FOR STIMULUS TERMS AS WELL AS FOR RESPONSE TERMS), AND AN
ASSOCIATION STAGE. THE MODEL APPEARS TO BE USEFUL IN INTERPRETING
DATA FROM STUDIES DEALING WITH THE EFFECTS OF CONTEXT ELEMENTS, OF
STIMULUS-TERM AND RESPONSE-TERM FAMILIARIZATION, OF STIMULUS-TERM AND
RESPONSETERM PRONUNCIABILITY, OF TERMS WITH DOUBLE FUNCTION, AND OF THE
GREATER S-R THAN R-S STRENGTH FOLLOWING PAIRED-ASSOCIATE LEARNING.
SOME FURTHER IMPLICATIONS OF THE MODEL FOR PAIRED-ASSOCIATE LEARNING,
SERIAL LEARNING, AND TRANSFER EXPERIMENTS WERE DISCUSSED AND THE NEED
FOR ADDITIONAL STUDY OF MEDIATING RESPONSES WAS EMPHASIZED.

269 266   0302   (*LEARNING, CONDITIONED REFLEX, TRANSFER OF TRAINING.)
 (*VERBAL BEHAVIOR, REACTION (PSYCHOLOGY).)   —
269 268   0305   ATOLL RESEARCH BULLETIN NOS. 76-84.

        NO ABSTRACT AVAILABLE

269 268   0303   (*PACIFIC ISLANDS, MICRONESIA, HAWAII.) -(PLANTS, SOILS
, *CORAL REEFS, ANI-MALS, ROCK, CLIMATE, ALGAE.)   —
269 269   0306   GAMMA-RAY PENETRATION EXPERIMENTS FOR A LIGHT
AIRCRAFT CARRIER USING DISTANT SOURCES AND SOURCES SIMULATING
CONTAMINATION OF THE HULL,

269 269   0306   THE PENETRATION OF GAMMA RAYS INTO COMPARTMENTS OF
AN AIRCRAFT CARRIER FROM TWO DIFFERENT RADIOISOTOPES WAS MEASURED IN 2
EXPERIMENTS. IN 1 EXPERIMENT, COBALT-60 AND CESIUM-137 POINT ISOTROPIC
SOURCES WERE EXPOSED NEAR THE HULL OF THE SHIP TO SIMULATE HULL
CONTAMINATION. MEASUREMENTS OF DOSE WERE MADE IN THE FORWARD PART OF
THE SHIP AT 4 DIFFERENT DECK LEVELS. DOSE DISTRIBTUION DATA ARE
PRESENTED FOR THE 2 SOURCES USED AND FOR THE DIFFERENT SOURCE POINTS
CONSIDERED. IN THE 2ND EXPERIMENT, A NOMINAL 500CURIE COLLIMATED
COBALT-60 SOURCE WAS EXPOSED AT A DISTANCE OF ROUGHLY 100 FEET FROM
DESIGNATED POINTS TO IRRADIATE 2 GENERAL REGIONS OF THE SHIP. DOSE.
DISTRIBUTIONS ARE PRESENTED FOR EACH OF 18 SOURCE POSITIONS USED.
FIVE DECKS WERE INSTRUMENTED IN EACH OF THE 2 GENERAL REGIONS
CONSIDERED. DIAGRAMS INDICATING SOURCE POSITIONS, DETECTOR POSITIONS,
AND HULL-PLATING THICKNESSES ARE PRESENTED.

269 269   0304   (*AIRCRAFT CARRIERS, NAVAL VESSELS, SHIP HULLS, SHIP P
LATES, FLIGHT DECKS, *SHIELDING, GAMMA RAYS, RADIOACTIVITY, *RADIO-LOGIC
AL CONTAMINATION, CONTAMINATION, RADIATION EFFECTS, MEASUREMENT, TESTS,
EFFECTIVENESS.) (RADIOACTIVE ISOTOPES, TEST EQUIPMENT, TEST METHODS.)
 —
269 271   0307   TABLES OF INTERFERENCE FACTORS FOR USE IN WINDTUNNEL
AND GROUND-EFFECT CALCULATIONS FOR VTOLSTOL AIRCRAFT, PART III. WIND
TUNNELS HAVING WIDTH-HEIGHT RATIO OF 1.0,

269 271   0307   TABLES OF INTERFERENCE FACTORS FOR USE IN WINDTUNNEL
AND GROUND-EFFECT CALCULATIONS FOR VTOLSTOL AIRCRAFT ARE PRESENTED FOR
WIND TUNNELS HAVING A WIDTH-HEIGHT RATIO OF 1.0. THESE TABLES WERE
MACHINE-CALCULATED AND ARE INTENDED FOR USE WITH THE PROCEDURES OF NASA
TECHNICAL REPORT R-124. THESE TABLES ARE PRESENTED WITHOUT COMMENT.

269 271   0305   (*VERTICAL TAKE-OFF PLANES, *SHORT TAKE-OFF PLANES, WI
ND TUNNEL MODELS, AERODYNAMICS, GROUND EFFECT, WIND TUNNELS, CONFIGURATI
ON, INTERFERENCE, MATHEMATICAL ANALYSIS, TABLES.)   -
269 276   0308   REPORT OF THE SUBPANEL ON ANALYTICAL TECHNIQUES
REFRACTORY METALS SHEET ROLLING PANEL MATERIALS ADVISORY BOARD.

269 276   0308   ANALYTICAL TECHNIQUES FOR MAJOR ALLOYING
CONSTITUENTS IN THE REFRACTORY METALS WERE FOUND TO BE ADEQUATE. THE
MAIN PROBLEM AREA IN ANALYSIS CONTINUES TO BE DETERMINATION OF THE
INTERSTITIAL ELEMENTS, O, N, C, AND H, AT LOW LEVELS. NEW METHODS OF
ANALYSIS INCLUDED, MASS SPECTROGRAPHIC, EMISSION SPECTROSCOPIC, X-RAY
FLUORESCENCE, INCLUDING THE MICROPROBE, INTERNAL FRICTION, AND
LOW-TEMPERATURE ELECTRICAL RESISTIVITY. METHODS FOR ANALYSIS OF TRACE
ELEMENTS OTHER THAN INTERSTITIALS SEEMED ADEQUATE. THE RESULTS OF A
SURVEY OF THE STATUS OF ANALYTICAL TECHNIQUES FOR THE REFRACTORY METALS
AND THEIR ALLOYS ARE REPORTED.

269 276   0306   (*REFRACTORY MATERIALS, HEAT RESISTANT ALLOYS, *ANALYSI
S, *METALS, CHEMICAL IMPURITIES, TESTS, TABLES.) (NIOBIUM ALLOYS, MOLYB
DENUM ALLOYS, TANTALUM ALLOYS, TUNGSTEN ALLOYS.) (TEST METHODS, OPTICS,
CHEMICAL ANALYSIS.)   -
269 278   0309   HEXADIENES BY DEHYDRATION OF C6 CYCLIC ETHERS.

269 278   0309   ATTEMPTS WERE MADE TO CATALYTICALLY DEHYDRATE,
6-C-ATOM CYCLIC ETHERS SUCH AS 2,5-DIMETHYLTETRAHYDROFURAN AND TO STUDY
THE COMPOSITICN AND COMPLEXITY OF THE PRODUCTS, AS WELL AS THE EXTENT
OF ISOMERIZATION ACCOMPANYING THE DEHYDRATIONS. THE IDENTIFICATION WAS
AIDED BY THE USE OF A FLAME IONIZATION GAS CHROMATOGRAPH. THE
PRODUCTS CONSISTED OF (1) A LO-BOILING END REPRESENTING FROM 1 TO 8$ OF
THE DISTILLATE, CONSISTING PRIMARILY OF CARBONYL COMPOUNDS AND
UNIDENTIFIED HYDROCARBONS (2) A MAJOR INTERMEDIATE FRACTION, BOILING
BETWEEN 50 AND 82 C WHICH CONTAINED A MIXTURE OF HEXADIENES AS WELL AS
OTHER 6-C-ATOM HYDROCARBONS UCH AS 1- AND 2-HEXENE AND BENZENE (3) A
HIGH BOILING END, WHICH CONSISTED PRIMARILY OF SOME UNREACTED
STARTING MATERIAL, DIMERS, AND OTHER UNIDENTIFIED CONSTITUENTS. THE
1,5-, 1,4-, 1,3- AND 2,4HEXADIENES WERE IENTIFIED. A STUDY WAS MADE OF
THE EFFECT OF CHANGING THE ACIDITY OF THE ALUMINA CATALYST ON THE
PRODUCTS OF DEHYDRATION. BY IMPREGNATING THE CATALYST WITH NA IONS THE
ACIDITY OF THE CATALYST WAS DECREASED. WHEN USED TO DEHYDRATE THE
6-C-ATOM CYCLIC ETHERS THE DEACTIVATED CATALYST EFFECTED LESS
ISOMERIZATION.

269 278   0307   (*DIENES, *DIENE SYNTHESIS, DEHYDRATION, ISOMERS, ETHER
S, *FURAN, SEPARA-TION, FRACTIONATION, CHROMATOGRAPHIC ANALYSIS, PHYSICA
L PROPERTIES, INFRARED SPECTROSCOPY.) (HYDROCARBONS, CYCLOHEXENES, BENZE
NES, MONO-CYCLIC COMPOUNDS, ISOPRENE, BUTADIENES.) (CATALYSTS, ALUMINUM
COMPOUNDS, OXIDES.) (CATALYSIS, CHEMICAL REACTIONS, CARBOXYLIC ACIDS, PO
LYMERIZATION.)   -
269 899   0310   EVALUATION OF EMPIRE DEVICES NF-105 NOISE AND FIELD
INTENSITY METER.

269 899   0310   A NOISE AND FIELD INTENSITY METER WAS EVALUATED TO
DETERMINE ITS SUITABILITY FOR MAKING RADIO INTERFERENCE MEASUREMENTS
IN ACCORDANCE WITH MILITARY REQUIREMENTS. THE RESULTS INDICATED THAT
THE METER IS ACCEPTABLE FOR MEASURING THE PARAMETERS OF INTERFERENCE

SIGNALS REQUIRED BY THE SPECIFICATIONS AT FREQUENCIES BETWEEN 0.15 AND
1000 MC. THE PERFORMANCE OF THE METER COMPARES FAVORABLY WITH THE
PERFORMANCE OF THE AN/PRM-1, TS-587/U, AND AN/URM-17 INTERFERENCE
MEASUREMENT DEVICES.

269 899   0308   (TESTS OF RADIO FIELDS,   INTENSITY, *METERS FOR MEASURE
MENT OF *RADIO INTERFERENCE.)   —
269 847   0311   F-415A CAMERA SYSTEM.

269 847   0311   A DESCRIPTION IS GIVEN OF THE F-415A ROTARY PRISM
PANORAMIC CAMERA. THE F-415A HAS BEEN OPTIMIZED FOR ACHIEVING
PHOTOGRAPHIC COVERAGE, HORIZON TO HORIZON, OF AN AREA WHILE OPERATING
AT A MINIMUM OF 500 FEET ABOVE THE TERRAIN AT AN AIRSPEED OF 600
KNOTS. THE STEREO VIEWING CAPABILITY IS MAINTAINED BY OBTAINING A
SIXTY PERCENT OVERLAP OF SUCCEEDING FRAMES OF PHOTOGRAPHY. THE F-415A
HAS, AS A DESIGN OBJECTIVE, A DYNAMIC RESOLUTION OF 20 LINES PER
MILLIMETER.

269 847   0309   (*WIDE FIELD CAMERAS, *AERIAL CAMERAS, PRISMS (OPTICS),
 PANORAMIC SCAN-NERS FOR AERIAL RECONNAISSANCE, DESIGN, EFFECTIVENESS.)

269 787   0312   CAVES IN SOUTHEASTERN TURKMENISTAN AND IN THE
IRKUTSKAYA OBLAST.

269 787   0312   NO ABSTRACT AVAILABLE

269 787   0310   (*UNDERGROUND STRUCTURES, *GEOL-OGY, ARCHAEOLOGY, USSR.
)   —
269 666   0313   SINGLE-VOWEL INTELLIGIBILITY TESTS,

269 666   0313   INTELLIGIBILITY STUDIES WERE MADE ON (1) AN EXPANDED
SINGLE-VOWEL WORD LIST COMPOSED OF DIFFERENT BEGINNING AND ENDING
CONSONANTS AND CONSONANTAL COMBINATIONS PRESENT IN THE LANGUAGE   (2)
SYLLABIC LISTS DERIVED FROM WORD-HALVES OF THE SAME VOWEL LIST   AND (3)
PB WORDS IN WHICH THE MOST FREQUENTLY OCCURRING CONSONANTS AND VOWELS
IN THE LANGUAGE ARE REPRESENTED. RESULTS OF THE STUDY INDICATED THAT
(1) AN EXPANDED SINGLE-VOWEL LIST OF 52 ITEMS CAN BE CONSTRUCTED TO
REPRESENT 90 PER CENT OF THE TOTAL POPULATION OF ENGLISH MONOSYLLABLES
(1159 ITEMS) FORMED WITH THIS VOWEL (2) THE EXPANDED SINGLE-VOWEL
LIST IS MUCH MORE DIFFICULT THAN THE PB LIST   (3) SYLLABIC LISTS AND
THE PB LIST ARE NOT HIGHLY RELATED AS INDICES OF INTELLIGIBILITY   AND
(4) SYLLABIC LISTS ARE REASONABLY ACCURATE PREDICTORS OF CONSONANTAL
ERRORS IN WORDS OF WHICH THEY ARE A PART.

269 666   0311   (*VERBAL BEHAVIOR, *INTELLI-GIBILITY, TESTS.)   (*VOCABU
LARY, *LANGUAGE, ANALYSIS.)   —
269 647   0314   ACCELERATING THE BUILDING OF NEW MACHINES,

269 647   0314

269 647   0312   (*INDUSTRY, *MACHINES, *INDUS-TRIAL RESEARCH, *USSR, S
CIENTIFIC RESEARCH, MANUFACTURING METHODS, ANALYSIS.)   —

269 777   0316   BRITTLE FRACTURE TRANSITION-TEMPERATURE CORRELATIONS
IN CONSTRUCTIONAL ALLOY STEELS.

269 777   0316   A CORRELATION WAS SOUGHT BETWEEN THE LOW-BLOW
TRANSITION TEMPERATURE (LBTT) AND THE TEMPERATURES AT WHICH BRITTLE
FRACTURE OCCURRED IN 4 SERVICE CASUALTIES. COMPARISONS WERE MADE
BETWEEN THE LBTT AND THE NAVAL RESEARCH LABORATORY DROP-WEIGHT
NIL-DUCTILITY TRANSITION (NDT) TEMPERATURE, WIDE-PLATE CRACK-ARREST
TEMPERATURE, AND THE MAXIMUM TEMPERATURE AT WHICH BRITTLE FRACTURE
WOULD PROPAGATE IN SPECIAL WIDE-PLATE CRACK PROPAGATION TESTS.
LOW-BLOW TRANSITIONTEMPERATURE TESTS WERE MADE USING LARGE (1.2
SQ-IN. CROSS SECTION) CHARPY SPECIMENS IN 2 STEELS ON WHICH SIMILAR
TESTS WERE MADE WITH SPECIMEN SIZES RANGING FROM ONE-HALF TO DOUBLE
STANDARD SIZE. IN SERVICE-CASUALTY MATERIALS, THE LBTT AND NDT
CORRELATED WITHIN 20 C. COMPARISON BETWEEN LBTT AND WIDE-PLATE
CRACK-ARREST TEMPERATURES INDICATED NEAR ONE-TO-ONE CORRELATION. IN
SPECIAL CRACK-PROPAGATION TESTS WITH SELF-STRESSED SPECIMENS, THE
MAXIMUM TEMPERATURE AT WHICH BRITTLE FRACTURE WOULD PROPAGATE WAS BELOW
THE LBTT, PROBABLY BECAUSE OF THE LOW STRESSES INVOLVED. THE LBTT
DETERMINED FROM THE OVERSIZED CHARPY SPECIMENS CONFIRMED EARLIER
OBSERVATION THAT THE LBTT IS INDEPENDENT OF SPECIMEN SIZE.

269 777   0314   (METAL PLATES, *STEEL, FAILURE (MECHANICS), *FRACTURE (
MECHANICS), BRITTLE MATERIALS, *TRANSITION TEMPERATURE, PROPAGA-TION, TE
ST METHODS, THEORY, IMPACT SHOCK, STRESSES, PLASTICITY, DEFORMATION.)

269 728   0317   MAGNETIC SHIELDING FACTORS OF A SYSTEM OF CONCENTRIC
SPHERICAL SHELLS,

269 728   0317   GENERAL EXPRESSIONS ARE DEVELOPED FOR THE SHIELDING
FACTORS OF CONCENTRIC SPHERICAL SHELLS OF LINEAR ISOTROPIC MAGNETIC
MATERIAL. APPROXIMATE RESULTS ARE GIVEN FOR SHELLS OF HIGHLY PERMEABLE
MATERIAL WHICH ARE THIN COMPARED TO THEIR RADII.

269 728   0315   (MAGNETIC MATERIALS, *SHIELDING, MAGNETIC FIELDS, SPHER
ES, METALS, *STRUCTURAL SHELLS, MAGNETIC SUSCEPTIBILITY.) (NUMERICAL AN
ALYSIS, TRANSFORMATIONS (MATHEMATICS), HARMONIC ANALYSIS, MATRIX ALGEBRA
.)

269 773   0318   OXIDATION OF TUNGSTEN AND TUNGSTEN BASED ALLOYS.

269 773   0318   THE RESULTS OF STUDIES RELATED TO THE OXIDATION OF W
AND ITS ALLOYS ARE STUDIED. THE PRESSURE OF WO3 POLYMERS OVER WO2 WAS
MEASURED IN A W KNUDSEN CELL AND FOUND TO AGREE WITH MEASUREMENTS IN A
PT CELL. LITERATURE DATA FOR WO2 WO3 WERE COMBINED WITH VAPOR
PRESSURES DETERMINED IN THIS PROJECT TO GIVE THERMODYNAMIC VALUES FOR
W18O49 AND W20O58. W OXIDATION RATES WERE MEASURED FROM 800 TO 1700 C
AND IN O PRESSURES BETWEEN 0.2 AND 0.02 ATMOSPHERES. THE EFFECTS OF O
PRESSURE INDICATE THAT THE RATE MAY BE GOVERNED BY O DISSOCIATING TO
ATOMS AT THE REACTING SURFACE. THE OXIDATION RATE IS DEMONSTRATED TO
BE INDEPENDENT OF THE OXIDE EVAPORATION RATE. ALL OF THE EVIDENCE
INDICATES THAT IF AN OXIDE BARRIER LAYER IS PRESENT AT TEMPERATURES
ABOVE 800 C IT MUST BE VERY THIN. STUDIES ON THE OXIDATION OF TA - W
ALLOYS BETWEEN 800 AND 1200 C INDICATE THAT THE 50-50 ALLOY HAS THE
GREATEST OXIDATION RESISTANCE, OXIDIZING AT A RATE AS MUCH AS 10 TIMES
SLOWER THAN W ALONE.

269 773   0316   (REFRACTORY MATERIALS, *TUNGSTEN, *TUNGSTEN ALLOYS, TAN
TALUM ALLOYS, *OXIDATION, CHEMICAL REACTIONS, REACTION KINETICS, HIGH TE
MPERATURE RESEARCH, TUNGSTEN COMPOUNDS, OXIDES, VAPOR PRESSURE, THERMODY
NAMICS, HEAT OF FORMATION.) (TEST EQUIPMENT, VACUUM FURNACES, TEMPERAT
URE, PRESSURE, X-RAY DIF-FRACTION ANALYSIS, MICROPHOTOGRAPHY, HEATING, I
NDUCTION HEATING.)   -
269 555   0319   THE PERFORMANCE OF INFORMATION PROCESSING EQUIPMENT
OR AN INDUSTRIAL APPLICATION OF THE ANALYSIS OF VARIANCE TO DATA ON THE
PERFORMANCE OF THREE BRANDS OF LONG-WEAR MAGNETIC TAPE AND TWO CHANNELS
AND FOUR TAPE DRIVES OF THE I. B. M. 7090,

269 555   0319   THREE BRANDS OF LONG-WEAR MAGNETIC TAPE WERE
TESTED. THE CRITERION FOR EVALUATING PERFORMANCE WAS THE NUMBER OF
ERROR STOPS ENCOUNTERED IN TESTING THE ENTIRE TAPE ON EACH REEL DURING
THE FIRST RUN. THE ANALYSIS OF VARIANCE WITH FOUR CRITERIA OF
CLASSIFICATION AND EQUAL FREQUENCIES WITHIN CELLS REVEALED THAT THERE
IS A SIGNIFICANT DIFFERENCE IN PERFORMANCE AMONG BRANDS. ALTHOUGH THE
EVIDENCE OF THIS DIFFERENCE IS RELIABLE, THE CLASSIFICATION OF REELS BY
BRANDS IS THE LEAST IMPORTANT BY THE FOUR USED. THE USE OF A
GUARANTEED REEL RATHER THAN A STANDARD STOCK REEL ACCOUNTED FOR THE
GREATEST AMOUNT OF VARIANCE, APPROXIMATELY 13 TIMES AS MUCH VARIANCE AS
THE BRANDS. THE TWO TYPES OF ERROR STOPS ACCOUNTED FOR OVER 7 TIMES AS
MUCH VARIANCE AS THE BRANDS. TWO GROUPS OF TAPE DRIVES ACCOUNTED FOR
ALMOST 3 TIMES AS MUCH VARIANCE AS THE BRANDS. THE STATISTICAL
ANALYSIS OF VARIANCE REVEALED THAT THE RANKING OF THE BRAND DEPENDS
HEAVILY UPON THE OTHER FACTORS. THE SIGNIFICANT TWO-WAY AND THREE-WAY
INTERACTIONS WERE INTERPRETED, AND THREE-DIMENSIONAL ILLUSTRATIONS
WERE PRESENTED TO GIVE A VISUAL, GEOMETRICAL INTERPRETATION OF THESE
INTERACTIONS OR JOINT EFFECTS OF TWO AND THREE FACTORS IN THE ANALYSIS
OF VARIANCE.

269 555   0317   (*TESTS, *DATA PROCESSING SYSTEMS, MAGNETIC TAPE, *FEAS
IBILITY STUDIES, RELIABILITY, QUALITY CONTROL.) (RESEARCH PROGRAM ADMIN
ISTRATION, DESIGN.) (NUMERICAL ANALYSIS, ANALYSIS OF VARIANCE.)   -
269 730   0320   SOLID-STATE AND MOLECULAR THEORY GROUP.

        NO ABSTRACT AVAILABLE
269 730   0318   (*SOLID STATE PHYSICS, *MOLECULAR STRUCTURE, THEORY.)
(*WAVE TRANSMISSION, ELECTRONS, ATOMIC ORBITALS, MOLECULAR ROTATION, MET
ALS, GALLIUM, WATER, MOLECULES, ENERGY, SCATTERING, AMPLITUDE MODULATION
, BRILLOUIN ZONES, HYPERFINE STRUCTURE, QUADRUPOLE MOMENTS, TABLES, PER
TURBATION THEORY.) (EQUATIONS, INTEGRAL EQUATIONS, INTEGRATION, INTEGRAL
S, MATRIX ALGEBRA, BESSEL FUNCTIONS, GREEN S FUNCTION, POLYNOMIALS, OPER
ATORS (MATHEMATICS), PARTIAL DIFFERENTIAL EQUATIONS, NUMERICAL METHODS A
ND PROCEDURES.)   -
269 724   0321   A STUDY OF THE HALOGENATION OF ALIPHATIC HYDROCARBONS
AND DERIVATIVES THEREOF.

269 724   0321   FLUORINATION, CHLORINATION AND BROMINATION OF THE 1-
AND 2-HALOALKANES AND RELATED COMPOUNDS WERE INVESTIGATED IN THE GAS
PHASE. FLUORINATION PROVED TO BE THE LEAST SELECTIVE PROCESS,
BROMINATION THE MOST. A SUBSTITUENT HALOGEN ACCELERATES BROMINATION AT
THE C ATOM TO WHICH SUBSTITUENT IS ATTACHED, BUT CHLORINATION IS
SLIGHTLY AND FLUORINATION STRONGLY RETARDED AT THIS POSITION. ALL 3
MODES OF HALOGENATION ARE RETARDED AT ADJACENT SITES FLUORINATION
BEING RELATIVELY MOST AFFECTED, BROMINATION THE LEAST. EXPERIMENTS
WERE CARRIED OUT OVER A RANGE OF TEMPERATURES AND INDICATE THAT CHANGES

IN REACTIVITY OBSERVED ARE DUE PRINCIPALLY TO CHANGES IN ACTIVATION
ENERGY FOR H ABSTRACTION. THESE RESULTS THROW LIGHT ON THE FACTORS
CONTROLLING H ABSTRACTION BY FREE RADICALS. RADICALS OF THE TYPE
-CHXCH- WHERE X IS A HALOGEN ATOM ARE RELATIVELY UNSTABLE.

269 724   0319   (*HALOCARBONS, *BROMOCARBONS, *CHLOROCARBONS, *FLUOROCA
RBONS, SYNTHESIS, *HALOGENATION, GASES, LIQUIDS, ORGANIC SOL-VENTS.) (A
LKYL RADICALS, BUTYL RADICALS, ALLYL RADICALS, BROMIDES, CHLORIDES, FLUO
RIDES, BUTANES, HEXANES, *BROMINATION, *CHLORINATION, *FLUORINATION.) (
HYDROGEN, IONS, FREE RADI-CALS, CHEMICAL REACTIONS, SUBSTITUTION RE-ACTI
ONS, REACTION KINETICS, STEREOCHEMISTRY, TEMPERATURE, STABILITY.) (INF
RARED SPECTRO-SCOPY, CHROMATOGRAPHIC ANALYSIS.)   -
269 659   0322   THE FOUR MODES OF PROPAGATION OF ADIABATIC WAVES IN A
PLASMA. RESEARCH ON A THEORY OF MAGNETOGAS DYNAMICS,

269 659   0322   A STUDY OF WAVE PROPAGATION IN AN INFINITE UNIFORM
PLASMA IS PRESENTED. IN MOST EXPERIMENTAL APPLICATIONS, THE PLASMA IS
LIMITED. THE MANY PROBLEMS THAT THIS SITUATION INTRODUCES ARE NOT
DISCUSSED. ONLY THE STRUCTURE OF DIFFERENT WAVES IN THE SIMPLEST CASE
OF PLANE WAVE IN AN INFINITE MEDIUM IS EXAMINED.

269 659   0320   (ELECTROMAGNETIC WAVES, WAVE TRANSMISSION, *WAVE ANALYS
IS.) (*PLASMA PHYSICS, PLASMA OSCILLATIONS, IONS, ELECTRONS, ACOUSTICS.
) (*MAGNETOHYDRODYNAMICS, HYDRO-DYNAMICS, *RESONANCE, DAMPING, POLARIZA
TION.) (EXPERIMENTAL DATA, TABLES.)   -
269 877   0323   SHORT-RANGE ORDER STRENGTHENING IN A LONG-RANGE
ORDERED PHASE,

269 877   0323   THE SHORT-RANGE ORDER SHEAR STRESS CONTRIBUTION IS
CALCULATED FOR BCC STRUCTURES USING FIRST APPROXIMATION QUASI-CHEMICAL
THEORY. A MAXIMUM EFFECT IS OBTAINED AT THE CRITICAL TEMPERATURE. THE
SHORT-RANGE-ORDER CONTRIBUTION IS COMPARED WITH THE CONTRIBUTIONS OF
MECHANISMS DUE TO SUMINO AND TO BROWN. THE SEPARATION OF THE
SHORT-RANGE ORDER AND THE SUMINO CONTRIBUTIONS THROUGH THEIR DIFFERENT
TEMPERATURE DEPENDENCIES IS DISCUSSED.

269 877   0321   (*SOLID STATE PHYSICS, IRON, ALUMINUM, BRASS, ALLOYS, S
OLIDS, SOLUTIONS, ATOMS, MICROSTRUCTURE, PHYSICAL PROPERTIES, *SHEAR STR
ESSES, DEFORMATION.) (FLUID FLOW, TEMPERATURE, MEASUREMENT, CHEMICAL BO
NDS, CRYSTAL STRUCTURE, LATTICES, PROBABILITY.)   -
269 793   0324   SOVIET LITERATURE ON PROTECTIVE STRUCTURES AND
COMPONENTS.

269 793   0324   NO ABSTRACT AVAILABLE

269 793   0322   (*SCIENTIFIC REPORTS, *USSR, PROTECTIVE COVERINGS, *SH
ELTERS, RAILROADS, CONSTRUCTION, GEOPHYSICS, MINING ENGINEERING, INDUSTR
IAL PLANTS, PROPELLANTS, HANDLING, LIQUEFIED GASES, OXYGEN.)   -
269 716   0325   OPERATIONS AND SUPPORT SCHEDULING METHODS DERIVED
FROM LABORATORY PROBLEM II 9LP-IIO - A MANNED ICBM SIMULATION,

269 716   0325   PROBLEM II WAS A MANNED SIMULATION ENCOMPASSING BOTH
OPERATIONS AND SUPPORT ACTIVITIES OF A FUTURE ICBM FORCE. A NUMBER OF
OPERATIONAL AND SUPPORT SCHEDULING TECHNIQUES THAT APPEAR USEFUL FOR
ACTUAL AIR FORCE MISSILE SYSTEMS ARE PRESENTED. SOME RESULTS SUGGESTED
BY THE EXPERIMENT ARE (1) AVOID TAKING MISSILES OFF ALERT FOR

SCHEDULED MAINTENANCE. WHEN POSSIBLE, DELAY SCHEDULED MAINTENANCE
UNTIL THE MISSILE HAS A MALFUNCTION AND DO BOTH SCHEDULED AND
UNSCHEDULED MAINTENANCE SIMULTANEOUSLY (2) AVOID DOING SCHEDULED
MAINTENANCE ON A ONE-AT-A-TIME BASIS (3) WHERE MALFUNCTION
CORRECTIONS ARE FOLLOWED BY POST-REPAIR CHECKOUTS, THESE CHECKOUTS
SHOULD BE SUBSTITUTED (AS MUCH AS POSSIBLE) FOR REGULAR CHECKOUTS.
THIS IS PARTICULARLY TRUE FOR CHECKOUTS THAT TAKE THE MISSILE OFF
ALERT AND (4) THERE SHOULD BE CLOSE AND CONTINUOUS COOPERATION
BETWEEN OPERATIONS AND SUPPORT TO ACHIEVE AN OBJECTIVE OF MAXIMUM ALERT
STATUS.

269 716   0323   (SIMULATION OF *GUIDED MISSILES, OPERATIONS BY MILITARY
 PERSONNEL.) (*SCHEDUL-ING OF MAINTENANCE FOR GUIDED MISSILES.) (AIR F
 ORCE OPERATIONS, OPERATIONS RESEARCH, LOGIS-TICS, AIR FORCE LOGISTICS.)

269 711   0326   COMPILATION OF UNPUBLISHED MATERIALS INFORMATION.

269 711   0326   MECHANICAL PROPERTY DATA, NOT HERETOFORE PUBLISHED,
ARE PRESENTED FOR 16 MATERIALS. THESE DATA WERE OBTAINED FROM
MATERIALS PROGRAMS CONDUCTED BY THE REPUBLIC AVIATION CORPORATION
DURING THE PAST 5 YR. THE FOLLOWING MATERIALS ARE CONTAINED IN THE
DATA COMPILATION AL ALLOYS 7075, 2024, X2219 TI ALLOYS - TI-6AL-4V,
TI-8MN LOW ALLOY STEELS (90$ FE, OR GREATER) - A1S14330 MOD HIGH
ALLOY STEELS (LESS THAN 90$ FE) - PH157MO, AM-355, 17-7PH, AM-357 NI
ALLOYS - INCONEL X, INCONEL 700, RENE' 41 ADHESIVES - LOCKTITE,
STRUCTURAL ADHESIVES AND MISCELLANEOUS SPECIAL PURPOSE MATERIALS -
PLASTER PARTING AGENTS.

269 711   0324   (*ALLOYS, *MATERIALS, *METALS, METALLIC COMPOUNDS, *ELA
STOMERS, FLUIDS, *LUBRICANTS, *ADHESIVES, *PLASTICS.) (MECHAN-ICAL PROP
ERTIES, TENSILE PROPERTIES, DEFOR-MATION, HARDNESS, HEAT TREATMENT, ELAS
TICITY, FATIGUE (MECHANICS), FAILURE (MECHANICS), TEST METHODS.) (ALUMI
NUM ALLOYS, TITANIUM ALLOYS, STEEL, NICKEL ALLOYS, CHROMIUM ALLOYS, MAN-
GANESE ALLOYS, IRON ALLOYS, VANADIUM ALLOYS.) (WELDING, WELDED JOINTS, B
RAZING, EXTRUSION, BONDING, PROCESSING, PRODUCTION.) TABLES.   -
269 767   0327   CESIUM ION PROPELLANT SYSTEM.

269 767   0327   THE CESIUM ION PROPELLANT SYSTEM CONSISTS OF THE
HARDWARE NECESSARY TO STORE, METER, VAPORIZE, AND SUPERHEAT CESIUM TO
ALLOW DELIVERY OF THIS VAPOR AT THE FLOW RATE, PRESSURE, AND
TEMPERATURE CONSISTENT WITH THE REQUIREMENTS OF CONTACT ION PROPULSION
DEVICES NOW UNDER INVESTIGATION. PRESENTED ARE THE RESULTS OF
COMPATIBILITY AND HANDLING STUDIES FOR CESIUM, DESIGN, AND DEVELOPMENT
OF SEPARATE SYSTEM COMPONENTS, AND INTEGRATION OF THE COMPONENTS INTO A
LABORATORY SYSTEM INCLUDING THE RESULTS OF A ONE WEEK ENDURANCE TEST.

269 767   0325   (ROCKET MOTORS FOR *ELECTRIC PROPULSION, *ION ROCKETS,
GASES, IONS, MAGNETOHYDRODYNAMICS, DESIGN, MILITARY REQUIREMENTS, MATERI
ALS, TESTS.) (*CESIUM, STORAGE, HANDLING, VAPORIZATION, HEATING, TEMPER
ATURE CONTROL, PRESSURE.)   -

269 679   0328   RESEARCH AND DEVELOPMENT OF TITANIUM ROCKET MOTOR
CASE.

269 679   0328   THE SUSTAINED NOTCHED TENSILE STRENGTH OF COLDROLLED
AND AGED SHEET STOCK AT THE 180,000 PSI YIELD STRENGTH LEVEL WAS LOWER
IN THE -35 F TO 200 F TEMPERATURE RANGE FOR A H CONTENT OF 70 THAN FOR
200 PPM STRENGTHS WERE EQUIVALENT AT 400 F. PRESS-FORGED PANCAKES
WITH A 0.15$-O CONTENT WERE CAPABLE OF ATTAINING THE 200,000 PSI YIELD
STRENGTH LEVEL BY DIRECT AGING AT 900 F. MULTIPLE-PASS TUNGSTEN INERT
GAS (TIG) WELDING PRODUCED NO IMPROVEMENT IN NOTCHED TENSILE STRENGTH
OR TOUGHNESS AS COMPARED WITH THE SINGLE-PASS METHOD DESPITE REDUCED
GRAIN SIZE AND INCREASED BEND DUCTILITY ELECTRON-BEAM WELDING YIELDED
SLIGHT IMPROVEMENTS AS COMPARED WITH TIG WELDING. CLOSED-DIE PRESS
FORGING OF SUBSCALE 14-IN.-DIAM DOMES BY THE PANCAKE AND PREFORM
TECHNIQUE AT 1650 F AND 1700 F PRODUCES SUPERIOR TENSILE DUCTILITY AT
THE 180,000 PSI YIELD STRENGTH LEVEL AS COMPARED WITH SIMILAR FORGING
AT 1850 AND 2000 F.

269 679   0326   (*ROCKET CASES, *TITANIUM ALLOYS, VANADIUM ALLOYS, CHRO
MIUM ALLOYS, ALUMINUM ALLOYS.) (MECHANICAL PROPERTIES, MANUFACTURING ME
THODS, SHEETS, ROLLING MILLS, AGING, FORGING, WELDING, ELECTRON BEAMS, H
EAT TREATMENT, MACHINING.) (CRYSTAL STRUCTURE, GRAINS (METAL-LURGY), IM
PURITIES, HYDROGEN, OXYGEN, X-RAY DIFFRACTION ANALYSIS.) TENSILE PROPER
TIES. -
269 681   0329   TASK SIROCCO. COMMUNITY REACTION TO AN ACCIDENTAL
CHLORINE EXPOSURE.

269 681   0329   INDIVIDUAL AND COMMUNITY RESPONSES TO AN ACCIDENTAL
CHLORINE GAS EXPOSURE IN RURAL LOUISIANA ARE EXAMINED. THE ACCIDENT
IS DESCRIBED, AND AN ANALYSIS IS MADE OF THE INFORMALLY-ORGANIZED
RESCUE OPERATIONS AND OF THE TREATMENT OF VICTIMS, PATTERNS OF
COMMUNICATION, ASSISTANCE PROVIDED BY ORGANIZED AGENCIES, AND
POST-EMERGENCY REACTIONS. THE RELATIONSHIP OF BEHAVIORAL RESPONSES TO
THE SOCIAL AND POLITICAL STRUCTURES OF THE COMMUNITY IS STUDIED. THE
PATTERN OF REACTION TO THIS EMERGENCY CAN BEST BE DESCRIBED AS
COOPERATIVE, RATHER THAN DIRECTED. CIVIL DEFENSE IS GENERALLY VIEWED
BY RESIDENTS OF THIS AREA AS SOMETHING CONNECTED WITH NUCLEAR WARFARE.
VICTIMS OF THE GAS EXPERIENCED STRONG PSYCHOLOGICAL REACTIONS. EVEN
THOUGH MANY VICTIMS WERE EXPOSED TO THE GAS FOR THIRTY MINUTES OR MORE,
 THERE WAS ONLY ONE HUMAN DEATH. DATA WERE ASSEMBLED FOR A FUTURE
COMPARATIVE STUDY DESIGNED TO IDENTIFY, FOR FURTHER INVESTIGATION,
FACTORS WHICH MIGHT PROVE TO BE OF VALUE IN EXTRAPOLATING FROM VARIOUS
DISASTER STUDIES TO BOTH OFFENSIVE AND DEFENSIVE SITUATIONS INVOLVING
THE OPERATIONA TABLES, 8 REFS. (REPT. NO. 563) (CONTRACT AF
49(638)465, PROJ. 9781) (AFOSR-1592) UNCLASSIFIED REPORT
DESCRIPTORS (*VISCOSITY, *FLUID FLOW, LIQ QUIDS, *BOUNDARY LAYERS,
SHOCK WAVES, WAVE TRANSMISSION, RE-ENTRY AERODYNAMICS.) (DEN SITY,
VELOCITY, GRAVITY, TEMPERATURE, PRES SURE, HEAT TRANSFER, THERMAL
DIFFUSION, SHEAR STRESSES.) (PERTURBATION THEORY, COMPLEX
VARIABLES, DIFFERENTIAL EQUATIONS, INTEGRAL TRANSFORMS.) *TABLES.
THE VISCOUS FLOW NEAR THE STAGNATION POINT ON AN INTERFACE BETWEEN TWO
LIQUIDS WITH DIFFERENT DENSITIES IS STUDIED. THE USE OF A MODEL ALLOWS
SOME FAIRLY GENERAL RESULTS TO BE READILY OBTAINED AS A RESULT OF A
MATHEMATICAL ANALYSIS.   MOREOVER, ALTHOUGH THE MODEL IS OBVIOUSLY NOT
IN FULL ACCORDANCE WITH RE-ENTRY PHENOMENA, IT IS BELIEVED THAT IT IS
NOT OVER-SIMPLIFIED, AND THAT SOLUTIONS OF REAL PROBLEMS OBTAINED ON

THE BASIS OF THE RESULTS OF THE PRESENT STUDY WILL BE AT LEAST
QUALITATIVELY CORRECT. EQUATIONS GOVERNING THE STATED PROBLEM CAN BE
TRANSFORMED TO THOSE DESCRIBING THE STAGNATION POINT FLOW AT A RIGID
WALL, BUT THE BOUNDARY CONDITIONS ARE DIFFERENT. RESULTS CONCERNING
THE VELOCITY AND TEMPERATURE FIELDS BASED ON A NUMERICAL INTEGRATION OF
THESE EQUATIONS ARE GIVEN. ALSO PRESENTED APPROXIMATE FORMULAS FOR
HEAT TRANSFER, DISPLACEMENT THICKNESS, MOMENTUM THICKNESS, BOUNDARY
LAYER THICKNESS, AND TEMPERATURE LAYER THICKNESS.

269 681   0327   (*POISONOUS GASES, *ACCIDENTS, *CHLORINE, CHEMICALS, RE
ACTION (PSYCHOLOGY), SOCIAL COMMUNICATION, SOCIOLOGY.)   -
269 389   0330   TURBO-ELECTRIC MAIN PROPULSION AND AUXILIARY POWER
PLANT, APPENDIX 2.

269 389   0330   A NEWLY DEVELOPED GENERATOR CALLED THE ACYLIC
GENERATOR IS DISCUSSED. IT IS A LOW VOLTAGEHIGH CURRENT DC GENERATOR.
A TURBO-GENERATOR POWER PLANT USING THIS ACYLIC GENERATOR AND INCLUDING
A 4000 KW AUXILIARY GENERATOR IS SHOWN. IT IS POINTED OUT THAT AN
ACYLIC GENERATOR CAN BE USED IN A SUBMARINE FOR MAIN PROPULSION POWER,
BUT TO FULFILL THE REQUIREMENTS OF THE LOW MAINTENANCE MACHINERY
PROJECT, A DESIGN STUDY SHOULD BE INITIATED TO UNEARTH EVERY FACT OF
ITS DESIGN, CONSTRUCTION, APPLICATION AND OPERATION.

269 389   0328   (*SUBMARINES, MAIN PROPULSION PLANTS, SHIP TURBINES, ST
EAM POWER PLANTS, AUXILIARY. POWER PLANTS, *SUBMARINE ENGINES, DIRECT CU
RRENT, *GENERATORS, DESIGN.)   -
269 391   0331   POWER CONTROL OF THE DOUBLE-ACTING
STEAMOTOR. APPENDIX 4.

269 391   0331   CONSIDERATION WAS GIVEN TO STEAMOTOR CONTROL BY (1)
VARIABLE CUT-OFF, AND (2) THROTTLING.

269 391   0329   (*EXTERNAL COMBUSTION ENGINES, POWER, CONTROL, *CONTROL
 SYSTEMS.) (MAIN PROPULSION PLANTS, SUBMARINE ENGINES, UNDER-WATER PROP
ULSION, *NUCLEAR PROPULSION, SUBMARINES.)   -
269 392   0332   FORCE AND TORQUE VARIATIONS OF THE DOUBLEACTING
STEAMOTOR, APPENDIX 5.

269 392   0332   NO ABSTRACT AVAILABLE

269 392   0330   (*EXTERNAL COMBUSTION ENGINES, TORQUE, MOMENTS, *DYNAMI
CS.) (MAIN PROPULSION PLANTS, SUBMARINE ENGINES, UNDERWATER PROPULSION
, *NUCLEAR PROPULSION, SUBMARINES.)   -
269 394   0333   HYDRAULIC TORQUE CONVERTER, APPENDIX 7.

269 394   0333   THE USE OF THE TORQUE CONVERTER PRINCIPLE IN MARINE
PROPULSION TRANSMISSION WAS INVESTIGATED. THIS INCLUDED SCALING AN
EXISTING DESIGN BY LAWS OF SIMILITUDE (WITH TWO UNIT COMPOUNDING FOR
HIGH SPEED RATIO), TORQUE CONVERTER COMPOUNDED WITH GEARING, AND SINGLE
UNIT TORQUE CONVERTER DESIGN WITH AXIAL FLOW COMPONENTS FOR HIGH SPEED
RATIO. CONCLUSIONS (1) NO EXISTING SINGLE UNIT TORQUE CONVERTER
DESIGN WILL MEET THE REDUCTION RATIO REQUIREMENTS OF 15 OR 25 TO 1 AT
PRACTICAL EFFICIENCY LEVELS (2) TO MEET REQUIRED SPEED RATIO, IT IS
NECESSARY TO COMPOUND TWO UNITS OF EXISTING DESIGN, COMPOUND ONE TORQUE
CONVERTER UNIT WITH SINGLE GEAR REDUCTION, AND DESIGN A NEW TORQUE
CONVERTER UNIT WITH PUMP AND TURBINE ELEMENTS ADAPTED TO HIGH SPEED

RATIO AND (3) HIGH SPEED RATIO TORQUE CONVERTER DESIGNS INVOLVE HIGH
FLOW, LOW HEAD, AND HIGH RELATIVE FLOW VELOCITIES, LEADING TO HIGH
FLUID FRICTION LOSSES AND TENDENCY TO CAVITATE.

269 394   0331   (TRANSMISSION, *AUTOMATIC TRANS-MISSIONS, DESIGN, FEASI
BILITY STUDIES.) (MAIN PROPULSION PLANTS, SUBMARINE ENGINES, UNDERWATER
PROPULSION, *NUCLEAR PROPULSION, SUBMARINES.)   ─
269 395   0334   HYDROKINETIC TRANSMISSION, APPENDIX 8.

269 395   0334   THIS REPORT IS AN EXTENSION OF INTERIM REPORT II
9DF61AT711) AND IT INVESTIGATES METHODS OF VARYING THE POWER OUTPUT OF
A HYDROKINETIC TRANSMISSION AT CONSTANT SPEED INPUT WITH MINIMUM LOSS
IN EFFICIENCY. THE REPORT ALSO PRESENTS METHODS OF OBTAINING ASTERN
POWER BY THE USE OF THRUST REVERSERS IN THE PROPELLER SYSTEM.
CONCLUSIONS THE TORQUE CONVERTER TRANSMISSION WITH A VARIABLE GEOMETRY
PUMP ROTOR IS THE MOST SATISFACTORY TRANSMISSION FOR OBTAINING POWER
CONTROL WITH CONSTANT INPUT SPEED FROM THE POINT OF VIEW OF
EFFICIENCY. THIS TYPE OF TRANSMISSION REQUIRES SOME INNOVATIONS FOR
PROVIDING RELIABLE METHODS FOR ATTACHMENT AND ADJUSTMENT OF THE PUMP
ROTOR BLADES. THRUST REVERSERS IN THE PROPELLER STREAM HAVE THE
GREATEST PROMISE FOR A RELIABLE METHOD OF PRODUCING REVERSING POWER.

269 395   0332   (TRANSMISSIONS, *AUTOMATIC TRANSMISSIONS, CONFIGURATIO
N, POWER, CONTROL, CONTROL SYSTEMS, DESIGN.) (MAIN PROPULSION PLANTS, S
UBMARINE ENGINES, UNDERWATER PROPUL-SION, *NUCLEAR PROPULSION, SUBMARINE
S.)   ─
269 396   0335   LIQUID SHEAR TRANSMISSION, APPENDIX 9.

269 396   0335   IT APPEARS THAT A LIQUID SHEAR TRANSMISSION CAN BE
DEVELOPED, HOWEVER, ITS RELIABILITY IS QUESTIONABLE IN THE 15,000 HP
RANGE. THE MINIMUM FILM THICKNESS IS OF THE ORDER OF 10 TIMES 10 TO
THE-6TH POWER INCHES. ANY DIRT, THERMAL OR PRESSURE DISTORTIONS WOULD
EFFECT THE PERFORMANCE OF THIS TRANSMISSION. FLUID SHEAR
TRANSMISSIONS IN THE ORDER OF HUNDREDS OF HORSEPOWER ARE QUITE FEASIBLE
AND RELIABLE. THE WEIGHT OF THIS TYPE OF TRANSMISSION IS QUITE LOW.

269 396   0333   (*TRANSMISSIONS, *TORQUE COUPLINGS FROM SHEAR STRESSES
, TORQUE OF LIQUIDS, HYDRAULIC FLUIDS, HYDRAULIC GEAR FLUIDS, ELASTICIT
Y, HYDRODYNAMICS.) (MAIN PROPULSION PLANTS, SUBMARINE ENGINES, UNDER-WA
TER PROPULSION, *NUCLEAR PROPULSION, SUBMARINES.)   ─
269 399   0336   FLUID TRANSMISSIONS, APPENDIX 12.

269 399   0336   NO ABSTRACT AVAILABLE

269 399   0334   (*TRANSMISSIONS, *AUTOMATIC TRANSMISSIONS, DESIGN, FEA
SIBILITY STUDIES.) (MAIN PROPULSION PLANTS, SUBMARINE ENGINES, UNDERWATE
R PROPULSION, *NUCLEAR PROPULSION, SUBMARINES.)   ─
269 291   0337   THEORY OF GRAVITATION AND ELECTROMAGNETISM.

269 291   0337   A REDERIVATION OF THE RAINICH THEORY BY USE OF
FOUR-COMPONENT SPINORS, A SPINOR CLASSIFICATION OF EMPTY SPACE-TIMES, A
STUDY OF STATIC CYLINDRICALLY SYMMETRIC SOLUTIONS OF THE RAINICH
EQUATIONS, AND INVESTIGATIONS CONCERNING THE INITIAL VALUE PROBLEM ARE
PRESENTED. ALSO INCLUDED WAS AN ATTEMPT TO WRITE A SET OF EQUATIONS
INVOLVING ONLY GEOMETRIC QUANTITIES WHICH WOULD BE EQUIVALENT TO THE
GRAVITATIONAL-NEUTRINO EQUATIONS AND A STUDY OF THE GRAVITATIONAL

FIELD OF A FASTMOVING MASS. THE IMCOMPLETENESS OF THE RAINICH THEORY
AS A PHYSICAL THEORY IS DISCUSSED AND THE IMPLIFICATIONS FOR FUTURE
WORK IS GIVEN.

269 291   0335   (*ELECTROMAGNETIC THEORY,   *GRAVITY, ELECTROMAGNETIC FI
ELDS, NEUTRINOS,   ENERGY, WAVE TRANSMISSION, *RELATIVITY THEORY.) (TENSO
R ANALYSIS, DIFFERENTIAL GEOMETRY, DIFFERENTIAL EQUATIONS.)   -
269 292   0338   HIGH TEMPERATURE SEMICONDUCTOR RESEARCH.

269 292   0338   A STUDY WAS MADE OF THE CAUSE OF EXPLOSIONS IN THE
HIGH PRESSURE MAGNETIC CZOCHRALSKI APPARATUS FOR THE GROWTH OF GAP.
ALL EXPLOSIONS WERE   ASCRIBED TO EITHER A DISCHARGE FROM THE
R. F. COIL, A MECHANICAL FAILURE OF QUARTZ MEMBERS, OR AN OVERHEATING
OF THE P RESERVOIR. THE STOICHIOMETRIC MELTING POINT FOR GAP IS 1467
   OR -10 C AT A DISSOCIATION PRESSURE OF 30   OR -10 ATM.   THE GAS PHASE
TRANSPORT OF GAAS WITH   I2 WAS STUDIED BY MEASURING THE OPTICAL
ABSORPTION IN THE VAPOR   NO FREE I2 IS PRESENT IN THE SYSTEM. THE HEAT
OF REACTION WAS 41 KCAL/MOLE   GA1. A STUDY WAS MADE OF FACTORS
AFFECTING THE CRYSTALLINITY OF GAAS INGOTS GROWN IN QUARTZ BOATS   .
ABRASIVE BLASTING THE BOAT INSTEAD OF ETCHING WITH HF ACID, REDUCES THE
WETTING OF THE BOAT BY THE MELT, AND RESULTS IN A MARKEDLY IMPROVED
CRYSTALLINITY. A GA RICH MELT CAUSES INCREASED SUPERCOOLING AND POORER
CRYSTALLINITY. THE HIGHER THE AS PRESSURE, THE BETTER IS THE
CRYSTALLINITY, EXCEPT THAT ABOVE ABOUT 2 ATM THE CRYSTALS ARE
EXCESSIVELY POROUS.

269 292   0336   (*SEMICONDUCTORS, *SEMICONDUCTING FILMS, GALLIUM COMPOU
NDS, ARSENIDES, PHOS-PHIDES, INTERMETALLIC COMPOUNDS, SINGLE CRYS-TALS,
CHEMICAL IMPURITIES, PHASE TRANSITIONS, *HIGH TEMPERATUE RESEARCH.) (CR
YSTALS, GROWTH, CRYSTALLIZATION, PRESSURE, PREPARATION, HIGH PRESSURE RE
SEARCH, HAZARDS.) (ELECTRICAL PROPERTIES, RESISTANCE, HEAT OF REACTION,
 THERMODYNAMICS, MEASUREMENT, TEST METHODS, TEST EQUIPMENT.) (VAPORS,
IODINE, TRANSPORT PROPERTIES.)   -
269 289   0339   PRODUCTION AND INVESTIGATION OF WELDABILITY OF
ONE-INCH THICK TITANIUM 6AL-4V PLATE.

269 289   0339   ONE-IN-THICK TI-6AL-4V PLATE WAS PRODUCED HAVING   .
GOOD STRENGTH AND A SURFACE CASE OF FINE GRAINED METAL. FIVE GROUPS OF
WELDED PLATES WERE EVALUATED BY TENSILE AND IMPACT TES. THE WELDS WERE
DEPOSITED WITH TI-6AL-4V FILLER WIRE, TI5AL-2.5SN FILLER WIRE, MST 55
FILLER WIRE, MST 40 FILLER FOR ROOT PASSES, TI-6AL-4V FILLER FOR
CENTRAL AND COVER PASSES, MST 40 FILLER FOR ROOT AND COVER PASSES, AND
TI-6AL-4V FILLER FOR CENTRAL PASSES. TEST RESULTS INDICATED THAT WELDS
MADE WITH TI-5AL-2.5SN FILLER WIRE HAD THE BEST COMBINATION OF STRENGTH
AND DUCTILITY. THREE WELDED PLATES FOR EACH OF THE 5 GROUPS AND 3
UNWELDED PLATES WILL BE TESTED BY EXPLOSION CRACK-STRTER AND
DROP-WEIGHT TESTS.

269 289   0337   (*TITANIUM ALLOYS, ALUMINUM AL-LOYS, VANADIUM ALLOYS, *
SHEETS, *WELDING, WELDS, PROCESSING, PRODUCTION.) (TESTS, TERMINAL BALL
ISTICS, FRACTURE (MECHANICS), IMPACT SHOCK, TENSILE PROPERTIES, HARDNESS
, MICROSTRUCTURE.) MECHANICAL PROPERTIES.   -

269 298   0340   ACCELERATION OF BONE REPAIR BY CHONDROITIN SULFATE
TREATMENT OF IMPLANTS,

269 298   0340   A HISTOLOGIC AND ROENTGENOGRAPHIC STUDY WAS MADE OF
THE REPAIR OF BONY DEFECTS IN THE CALVARIA OF ALBINO RATS.   AN
ACCELERATED RATE OF BONE REPAIR WAS OBSERVED IN WOUNDS INTO WHICH
CHONDROITIN SULFATE-TREATED DEMINERALIZED BONE WAS IMPLANTED, AS
EVIDENCED BY MAXIMUM REPAIR OF THE DEFECT IN 6 WEEKS, WHILE 9 WEEKS
WERE REQUIRED FOR MAXIMUM HEALING WHEN UNTREATED DEMINERALIZED BONE WAS
USED.   IN ADDITION, ACID-SOLUBLE COLLAGEN PRECIPITATED WITH CHONDROITIN
SULFATE WAS MORE EFFECTIVE IN THE HEALING OF THE BONY DEFECT THAN WAS
ACID-SOLUBLE COLLAGEN PRECIPITATED WITH NACL.   IN NO CASE, HOWEVER,
WERE ANY OF THE MATERIALS USED AS EFFECTIVE AS DEMINERALIZED BONE
TREATED WITH CHONDROITIN SULFATE IN CAUSING THE RAPID REPAIR OF THE
BONE.   THE POSSIBILITY EXISTS THAT CHONDROITIN SULFATE, OR A COMPLEX OF
CHONDROITIN SULFATE WITH A PROTEIN, HAS, IN THESE INSTANCES, ACTED AS
AN 'INDUCTION' FACTOR FOR THE FORMATION OF THE NEW BONE NECESSARY TO
REPAIR THE BONY DEFECT.

269 298   0338   (*BONE, *TRANSPLANTATION, CHONDROITIN SULFATE, THERAPY.
) (HISTOLOGICAL SECTIONS, *CALCIFICATION, TISSUES (BIOLOGY), REGENERATIO
N.)   SCIENTIFIC RESEARCH, *MEDICAL RESEARCH.   -
269 299   0341   DYNAMIC LOADS IN THE ATLAS-ABLE 5 DURING TRANSONIC
BUFFETING,

269 299   0341   DYNAMIC LOADS ARE DETERMINED FOR THE ATLAS-ABLE 5
VEHICLE DURING TRANSONIC FLIGHT DUE TO UNSTEADY AERODYNAMIC PRESSURES
ACTING ON THE NOSE FAIRING.   THESE PRESSURES OCCUR AS RANDOM VARIABLES
AND APPEAR TO BE ASSOCIATED WITH SHOCK   FRONT OSCILLATIONS AND VORTEX
SHEDDING PHENOMENA.   SUCH PHENOMENA MAY OCCUR DUE TO NOSE FAIRING
SHAPE, MACH NUMBER OF FLOW, AND ANGLE OF ATTACK.

269 299   0339   (*SPACE PROBES, *GUIDED MISSILE NOSES, LOAD DISTRIBUTIO
N, TRANSONIC FLIGHT, TRANSONICS, SHOCK WAVES, PRESSURE, OSCILLA-TIONS, T
HEORY, MATHEMATICAL ANALYSIS.)   -
269 301   0342   EQUIPMENT DESIGN CONSIDERATIONS FOR SPACE
ENVIRONMENT,

269 301   0342   A REVIEW IS PRESENTED ON THE EFFECT OF SPACE
CONDITIONS ON MATERIALS AND ELECTRONIC PARTS USED SUCCESSFULLY IN THOSE
SPACE VEHICLES WHICH HAVE ACCOMPLISHED THEIR OBJECTIVES.   INFORMATION
IS GIVEN ON THE SELECTION OF MATERIALS AND ELECTRONIC PARTS FOR SPACE
APPLICATIONS BASED ON KNOWLEDGE OF BOTH THE KNOWN AND THE CALCULATED OR
ESTIMATED CHARACTERISTICS OF SPACE ENVIRONMENT.

269 301   0340   (*SPACE ENVIRONMENTAL CONDI-TIONS ON SPACESHIPS, SPACE
FLIGHT, AIRFRAMES, ELECTRICAL EQUIPMENT, ELECTRONIC EQUIPMENT, ELECTROME
CHANICAL CONVERTERS, MATERIALS, PLASTICS, METALS, ALLOYS, CERAMIC MATERI
ALS, ELASTOMERS, RADIATION DAMAGE, RADIATION EFFECTS, ELECTROMAGNETIC EF
FECTS, THERMAL RADIATION, METEORITES, VACUUM SYSTEMS, TEM-PERATURE CONTR
OL.)   -

269 302   0343   TEMPERATURE CONTROL SYSTEM FOR THE ATLAS ABLE-4 LUNAR SATELLITE,

269 302   0343   THE NEED TO CONTROL THE MEAN INTERNAL TEMPERATURE OF THE ABLE-4 ATLAS LUNAR SATELLITE WITHIN THE RANGE OF 45 TO 70 F LED TO THE DEVELOPMENT OF AN ACTIVE, LIGHTWEIGHT CLOSED LOOP TEMPERATURE CONTROL SYSTEM. THE SYSTEM SENSES INTERNAL TEMPERATURES AND ALTERS THE EFFECTIVE RADIATION PROPERTIES OF THE SATELLITE SO AS TO MAINTAIN THE INTERNAL TEMPERATURE WITH THE SPECIFIED RANGE, EVEN IN THE EVENT OF SOME ADVERSE EFFECTS OF THE SPACE ENVIRONMENT ON THE RADIATION PROPERTIES. THE SYSTEM CONSISTS OF 50 ROTATABLE FOUR-BLADED MASKS, EACH ACTUATED BY A SPIRALLY WOUND BIMETAL STRIP THE ROTATION OF THE MASKS (WHICH CONTROL 20$ OF THE SATELLITE SURFACE) EXPOSES SURFACE AREAS HAVING DIFFERING ABSORBING AND EMITTING CHARACTERISTICS. BOTH THE PROBLEMS ENCOUNTERED AND THE METHODS DEVELOPED TO MEET THESE PROBLEMS ARE DISCUSSED.

269 302   0341   (*LUNAR PROBES, SATELLITE VEHI-CLES, TEMPERATURE, CONTR OL, *TEMPERATURE CONTROL, DESIGN.)   -   _____
269 601   0344   STATISTICS OF CYCLONIC ACTIVITY IN THE WESTERN MEDITERRANEAN,

269 601   0344   NO ABSTRACT AVAILABLE

269 601   0342   (*CYCLONES, *MEDITERRANEAN SEA, STATISTICAL ANALYSIS.) (NAVAL OPERATIONS, CLIMATIC FACTORS.)   -   _____
269 603   0345   HIGH TEMPERATURE RESISTANT TRANSPARENT PLASTICS.

269 603   0345   PURIFICATION OF THE DIGLYCIDYL ETHER OF BISPHENOL A (DEBA) BY VACUUM DISTILLATION AND DECOLORIZATION OF THE TRIMETHOXYBOROXINE (TMB) CATALYST PRODUCED COLORLESS STARTING MATERIALS. REACTION OF THESE MATERIALS PRODUCED A WATER-WHITE RESIN. AFTER CURING IN VACUUM, THE 0.25 IN. THICK CASTINGS HAD A LUMINOUS TRANSMISSION OF 88$. SMALL QUANTITIES OF LOW COLOR EPOXY NOVOLAC RESIN WERE OBTAINED BY MOLECULAR DISTILLATION OF A COMMERCIAL PRODUCT. THE DISTILLATE REACTED RAPIDLY WITH TMB TO FORM A HARD SOLID WITH MUCH LOWER COLOR THAN OBTAINED FROM ANY PREVIOUS RESIN OF THIS TYPE. CAST RESINS OBTAINED FROM HEXAHYDROPHTHALIC ANHYDRIDE AND VINYLCYCLOHEXENE DIOXIDE WERE EXTREMELY NOTCH SENSITIVE AND BRITTLE.

269 603   0343   (*TRANSPARENT PANELS, *OPTICAL MATERIALS, *OPTICAL PLAS TICS, *OPTICAL COAT-INGS, *HEAT RESISTANT POLYMERS, *EPOXY RESINS, ACRYL IC RESINS, RESINS, PLASTICS.) (PHTHALIC ACIDS, ANHYDRIDES, VINYL RADICA LS, CYCLO-HEXENES, DIOXIDES.) (EPOXIDES, HETEROCYCLIC COMPOUNDS, PROCES SING, AGING, SYNTHESIS.) (ULTRAVIOLET RADIATION, RADIATION DAMAGE, LIGHT TRANSMISSION, MECHANICAL PROPERTIES, AIRCRAFT FINISHES, SUPERSONIC PLAN ES.) HIGH TEMPERATURE RESEARCH.   -   _____
269 612   0346   PROBLEMS OF INFORMATION TRANSMISSION NO. 5

269 612   0346   THE RESULTS OF EXPERIMENTAL STUDIES PERFORMED IN THE LAST TWO YEARS IN THE LABORATORY OF INFORMATION TRANSMISSION SYSTEMS ARE PRESENTED. THIS ARTICLE DESCRIBES THE METHOD OF MEASURING THE FREQUENCY DISTRIBUTION OF MESSAGE ELEMENTS FROM VARIOUS SOURCES AND ADDUCES THE RESULTS OF MEASUREMENT OF FREQUENCY DISTRIBUTION WHICH, IN THE CASE OF CERTAIN SOURCES, IS CARRIED TO THE LEVEL OF 4TH-ORDER

DISTRIBUTIONS. IN APPENDICES TO THIS COLLECTION OF ARTICLES THERE ARE PROVIDED TABLES OF THE FUNCTIONS NECESSARY TO COMPUTE THE ENTROPY OF DISCRETE DISTRIBUTION.

269 612   0344   (*CODING, DATA TRANSMISSION SYSTEMS, STATISTICAL ANALYS IS, *SEQUENTIAL ANALYSIS.) (*INFORMATION THEORY, STATISTICAL DISTRIBUTI ONS, *COMMUNICATIONS THEORY, SEQUENCES.) USSR.   —
269 617   0347   NO TITLE AVAILABLE

269 617   0347   BASIC PROPERTIES AND METHODS OF PRODUCING TI AND ITS ALLOYS ARE PRESENTED. THE EFFECT OF COMPOSITION OF ALLOYS AND HARMFUL IMPURITIES UPON WELDABILITY IS SHOWN, FEATURES OF HEAT PROCESSES DURING WELDING ARE EXAMINED, AS WELL AS THE CONTROL OF STRUCTURE AND PROPERTIES OF WELDED JOINTS AND THE PRINCIPLES OF CHOOSING THE CONDITIONS OF WELDING AND HEAT TREATMENT. ARC WELDING IN INERT GASES AND UNDER FLUX, ELECTRIC SLAG WELDING, RESISTANCE WELDING AND SOLDERING ARE DESCRIBED. BASIC AREAS OF THE USE OF WELDED CONSTRUCTIONS ARE INDICATED. (AUTHOR) (TISTA/VGW) OTS PRICE $2.60   FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO. THE UPPER ATMOSPHERE AND INTERPLANETARY MEDIUM, BY V. G. KURT. 7 AUG 61, 23P. (TRANS. NO. MCL- 1047/1 OF PRIODA 223-30, 1961) UNCLASSIFIED REPORT   DESCRIPTORS   (*ASTROPHYSICS, ATMOSPHERE   MODELS, *UPPER ATMOSPHERE, PLANETARY ATMOS   PHERES, ATMOSPHERE, IONOSPHERE, EXOSPHERE, ELECTRICAL CORONA, ATMOSPHERICS, INTERSTELLAR   MATTER, ELECTRONS, IONS, DENSITY, ATMOSPHERIC   SOUNDING, MANOMETERS, SOUNDING ROCKETS, SATELLITE VEHICLES, USSR.)

269 617   0345   (*TITANIUM, *TITANIUM ALLOYS, *WELDING, WELDS, ARC WELD ING, ARC WELDS, ELECTRIC WELDING, SPOT WELDING, WELDED JOINTS, PROCESS ING, PRODUCTION, MANUFACTURING METHODS.)   (HEAT TREATMENT, IMPURITIES, WELDING FLUXES, SOLDERING, CONTROLLED ATMOSPHERES.) (MECHANI—CAL PROPE RTIES, PHYSICAL PROPERTIES, PHASE TRANSITIONS.) USSR.   —
269 637   0348   DUAL CONTROL THEORY, IV.,

269 637   0348   A GENERALIZED ALGORITHM IS DERIVED FOR THE OPTIMAL DUAL CONTROL STRATEGY FOR AN OBJECT WITH SEVERAL INPUTS AND OUTPUTS, HAVING MEMORY. AN EXAMPLE OF THE APPLICATION OF THIS ALGORITHM IS GIVEN. METHODS ARE EXAMINED FOR FURTHER DEVELOPMENT IN THE FIELD OF DUAL CONTROL THEORY.

269 637   0346   (*CONTROL SYSTEMS, SYNTHESIS, MEMORY DEVICES, THEORY, V ECTOR ANALYSIS.) USSR.   —
269 643   0349   DETERMINING THE DENSITY OF LIQUID OXYGEN WITHIN A WIDE RANGE OF TEMPERATURES AND PRESSURES,

269 643   0349   THE THERMAL PROPERTIES OF LIQUID O (LOX) WERE STUDIED WITH A LOADED PIEZOMETER. THE AMOUNT OF O DISCHARGED FROM THE PIEZOMETER DURING THE EXPERIMENT WAS MEASURED (IN GASEOUS FORM) VOLUMETRICALLY. A PRECISION EXPERIMENTAL DEVICE WAS DEVELOPED TO STUDY THE DENSITY OF LOX WITHIN THE TEMPERATURE RANGE -190 TO 120 DEGREES TO PRESSURES OF 200 KG/SQ CM, AND ALSO THE DENSITY OF LOX ALONG THE SATURATION CURVE IN THIS SAME TEMPERATURE RANGE. THE EXPERIMENTAL DATA WERE PROCESSED ANALYTICALLY FOR PRESENTATION OF THE THERMAL PROPERTIES OF LOX IN TABULAR FORM. NOTE THIS ABSTRACT COMPRISES THE ENTIRE DOCUMENT.

269 643   0347   (*LIQUEFIED GASES, *OXYGEN, DENSITY, MEASUREMENT, TEMPE
RATURE, PRESSURE, HIGH PRESSURE RESEARCH, THERMODYNAMICS, CRYOGENICS.)
USSR.   -
269 650   0350   LOGISTICS.   AN ASTIA REPORT BIBLIOGRAPHY,

269 650   0350   THIS BIBLIOGRAPHY WAS PREPARED BY ASTIA IN RESPONSE
TO FREQUENT REQUESTS FOR INFORMATION ON LOGISTICS, AND BECAUSE OF THE
DEFENSE DEPARTMENT'S CONTINUING INTEREST IN THE EFFECTIVE PROCUREMENT,
MANAGEMENT, AND DISTRIBUTION OF SUPPLIES.   CITATIONS ARE INCLUDED FOR
DOCUMENTS CATALOGED BY ASTIA FROM 1953 THROUGH 1 DECEMBER 1961.
REFERENCES ARE ALPHABETICALLY ARRANGED BY SUBJECT AREAS CONCERNING
LOGISTICS MANAGEMENT, MATERIALS HANDLING, PROCUREMENT, STRATEGIC
MATERIALS, AND TRANSPORTATION.   WITHIN EACH SUBJECT AREA, REPORTS
PUBLISHED BY MILITARY AGENCIES ARE LISTED ALPHABETICALLY BY SOURCE AND
TITLE   REPORTS PUBLISHED BY DEPARTMENT OF DEFENSE CONTRACTORS ARE CITED
BY SOURCE, CONTRACT AND DATE.

269 650   0348   *LOGISTICS, *SUPPLIES, *STRA-TEGIC MATERIALS, SUPPLY DE
POTS, MILITARY MOBILIZATION, MILITARY OPERATIONS, PROCURE-MENT, CONTROL,
*MANAGEMENT ENGINEERING, TRANSPORTATION, *BIBLIOGRAPHY.   -
269 651   0351   BEFORE A MANNED FLIGHT,

269 651   0351   THE EFFECT OF G-FORCES (ACCELERATION AND
DECELERATION) AND OF WEIGHTLESSNESS ARE DISCUSSED   TEST EQUIPMENT ARE
ALSO MENTIONED.

269 651   0349   (SPACE FLIGHTS, SPACESHIPS, MANNED, PHYSIOLOGY, GRAVITY
, *ACCELERATION, *DECELERATION, WEIGHTLESSNESS, SIMULATION, ROCKET PROPE
LLED SLEDS, CENTRIFUGES.)   USSR.   -
269 662   0352   HAZARD CLASSIFICATION TEST OF CARTRIDGE ENGINE
STARTER, MC-1, MC-2, MXU-4/A (AMOCO) AND MXU-4/A (OLIN MATHIESON),

269 662   0352   FIVE DETONATION TESTS WERE CONDUCTED ON EACH OF THE
4 TYPES OF CARTRIDGES TO DETERMINE IF A DETONATION WOULD OCCUR AND IF
SO, WOULD THE DETONATION PROPAGATE FROM CARTRIDGE TO CARTRIDGE.   ONE
CARTRIDGE IN A SHIPPING CONTAINER (CARDBOARD BOX) WAS PRIMED WITH 30
GRAINS OF TETRYL AND INITIATED WITH AN ENGINEER SPECIAL BLASTING CAP.
EACH TYPE OF CARTRIDGE WAS ALSO SUBJECT TO A COOK-OFF TEST.   NO
DETONATIONS OCCURRED IN ANY OF THE TESTS.   THE MC-1 AND MC-2 PRIMED
CARTRIDGES WERE RUPTURED AND THREW BURNING PROPELLANT WITHIN A 10-FT
RADIUS.   THE REMAINS OF THE CARTRIDGE CASES ALSO REMAINED IN THIS
AREA.   HE MXU-4/A CARTRIDGES DID NOT IGNITE AS THE PRIMER CHARGE COULD
NOT BE PLACED ON THE PROPELLANT GRAIN.   ALL OF THE CARTRIDGES
COOKED-OFF BETWEEN 10 AND 15 MIN AFTER THE SCRAP LUMBER WAS IGNITED.
IT WAS CONCLUDED THAT ALL OF THE CARTRIDGES TESTED WERE QUANTITY
DISTANCE CLASS 2, STORAGE COMPATABILITY GROUP J AND ICC SHIPPING CLASS
C.

269 662   0350   *JET ENGINES, *AIRPLANE ENGINE STARTERS, *STARTER CARTR
IDGES, AMMONIUM RADI-CALS, NITRATES, PROPELLANTS, EXPLOSIVES, DETONATION
, HAZARDS, COMBUSTION, STORAGE, SHIPPING, CLASSIFICATION, TESTS.   -
269 674   0353   CHARACTERISTICS OF EXTRUDING METAL BY HIGHPRESSURE
LIQUID AT ELEVATED TEMPERATURES,

269 674   0353   INVESTIGATIONS OF THE PROCESS OF EXTRUDING METALS BY
A LIQUID UNDER HIGH PRESSURE WERE MADE.   THE PROCESS OF HYDRAULIC
EXTRUSION OF METALS AT ELEVATED TEMPERATURES IS DESCRIBED.   THIS METHOD
REDUCED THE FORCE REQUIRED TO DEFORM METALS AND INDICATED A POSSIBLE
METHOD OF SOLVING THE PROBLEM OF WORKING HARD-TO-DEFORM METALS BY
HIGH-PRESSURE LIQUID.

269 674   0351   (*EXTRUSION, *METALS, *HYDRAULIC SYSTEMS, LIQUIDS, *PRE
SSURE, HEAT TREATMENT, DEFORMATION.) (FATTY ACIDS, MINERAL OILS, OILS,
KEROSENE, ETHANOLS, GRAPHITE, ADDITIVES, CHLORINE, PHOSPHOROUS, SULFUR.
) USSR, HIGH TEMPERATURE RESEARCH, HIGH PRESSURE RESEARCH, LUBRICANTS.

269 675   0354   METEOROLOGICAL SUPPORT FOR BALLOON OPERATIONS.

269 675   0354   SAFETY AND INTERNATIONAL CONSIDERATIONS HAVE LED THE
AIR FORCE TO RECOGNIZE THE NEED FOR PREDETERMINED TRAJECTORIES TO
PROGRAM BALLOON OPERATIONS FOR PERIODS WHEN WEATHER CONDITIONS EXCEED
CERTAIN SPECIFIED MINIMUMS.   THIS PAMPHLET PRESENTS A DESCRIPTION OF
BALLOON OPERATIONS AND STRATOSPHERIC FORECASTING TECHNIQUES AS THEY
HAVE EVOLVED AT VERNALIS, CALIFORNIA.   IT SHOULD ASSIST THOSE
METEOROLOGISTS WHO REQUIRE FAMILIARIZATION IN THE COMPLEX ART OF
BALLOON TRAJECTORY FORECASTING.

269 675   0352   (*METEOROLOGICAL BALLOONS, FLIGHT PATHS, METEOROLOGICAL
 DATA, MILITARY REQUIRE-MENTS, STRATOSPHERE, WEATHER FORECASTING, MATHEM
ATICAL PREDICTION, TABLES.)   -
269 676   0355   SERVICE TEST OF BULLDOZER, EARTHMOVING, TANK
MOUNTING, M9.

269 676   0355   TESTS WERE CONDUCTED TO DETERMINE THE SUITABILITY OF
THE M9 BULLDOZER AND ITS MAINTENANCE PACKAGE FOR USE WITH THE M60
TANK.   IT WAS CONCLUDED THAT THE TEST ITEM IS SUITABLE FOR USE WITH THE
 M60 TANK WHEN CERTAIN DEFICIENCIES ARE CORRECTED.

269 676   0353   (INSTALLATION OF *EARTH MOVING EQUIPMENT, *BULLDOZERS O
N TANKS.) (BULLDOZERS, OPERATION, MAINTENANCE, RELIABILITY, TESTS.)

269 682   0356   ON UTILITY. I. THE VALIDITY OF THE EXPECTED UTILITY
HYPOTHESIS. II. ON BERNOULLIAN UTILITY FOR GOODS AND MONEY,

269 682   0356   A MODEL OF BEHAVIOR IN CIRCUMSTANCES OF UNCERTAINTY
IS NOW REPRESENTED BY A PREFERENCE ORDER BETWEEN CERTAIN DISTRIBUTIONS
WHICH DETERMINES A BEST DISTRIBUTION AMONG ANY THAT ARE ATTAINABLE ON
ANY OCCASION, AND HENCE AN ACT WHICH IS POSSIBLE AND WHICH HAS THAT
DISTRIBUTION AS OUTCOME.   BUT SINCE CERTAINTY APPEARS AS A SPECIAL
INSTANCE OF UNCERTAINTY, THE PREFERENCE ORDER BETWEEN OBJECTS X WHICH
GIVES A MODEL FOR BEHAVIOR WITH CERTAINTY, INDUCES A CORRESPONDING
ORDER BETWEEN SPECIAL DISTRIBUTIONS WHICH MUST BE CONTAINED IN THIS
PREFERENCE ORDER BETWEEN OTHER DISTRIBUTIONS.   THE EXPECTED UTILITY
HYPOTHESIS FOR UNCERTAIN CHOICE IS THE HYPOTHESIS THAT EVERY OBJECT XR
HAS A CERTAIN UTILITY U(XR) DETERMINING THE EXPECTED UTILITY FOR AN ACT
WHICH GIVES OUTCOME X WITH A PROBABILITY DISTRIBUTION AND THAT
PREFERENCE BETWEEN DISTRIBUTIONS CORRESPONDS TO RELATIVE MAGNITUDE OF
EXPECTED UTILITY, SO CHOICE IS DETERMINED BY THE MAXIMUM OF POSSIBLE
EXPECTED UTILITY.

269 682   0354   (STATISTICAL ANALYSIS, *STATISTI-CAL DISTRIBUTION, PROB
ABILITY, *GAMES THEORY.) (ECONOMICS, COSTS, *MONEY.)   -
269 685   0357   THE MEASUREMENT OF AERODYNAMIC FORCES AND   MOMENTS IN
THE NOL 4-IN. HYPERSONIC SHOCK TUNNEL NO. 3,

269 685   0357   TWO LIGHT-WEIGHT MODELS OF MISSILES ARE SUSPENDED BY
FINE THREADS. ALONGSIDE, A LIGHT-WEIGHT   SPHERE IS SUSPENDED. A
HIGH-SPEED CAMERA IS FOCUSED ON THE MODELS THROUGH A WINDOW AND
ILLUMINATION IS BY A SHORT-DURATION, HIGH-INTENSITY LIGHT SOURCE.   WHEN
THE SHOCK TUNNEL IS FIRED, THE LIGHT SOURCE IS ACTUATED, THE FINE
THREADS ARE SNAPPED, AND THE MODELS ARE PHOTOGRAPHED FOR 2-1/4
MILLISECONDS AS THEY MOVE FREELY IN THE SHOCK TUNNEL FLOW. FROM
HIGHSPEED FILM, DATA OF THE HORIZONTAL, VERTICAL, AND ANGULAR MOTIONS
OF THE MODELS AND THE SPHERE AS FUNCTIONS OF TIME ARE OBTAINED.

269 685   0355   (*SHOCK TUBES, *HYPERSONIC WIND TUNNELS, TEST FACILITIE
S, HIGH SPEED PHOTOG-RAPHY, TEST METHODS, OPERATION, DESIGN.) (WIND TUNN
EL MODELS, SPHERES, RE-ENTRY VEHI-CLES, AERODYNAMICS, RE-ENTRY AERODYNAM
ICS, GUIDED MISSILES, LIFT, DRAG, MOMENTS, STABIL-ITY, MEASUREMENT, MOD
EL TESTS.) (SHOCK TUBES, EXPERIMENTAL DATA, MATHEMATICAL ANALYSIS.)
-
269 686   0358   PRODUCTION ENGINEERING STUDY OF THE T28E2   CLUSTER,
BOMB, FRAGMENTATION,

269 686   0358   IN THIS STUDY, NO ATTEMPT WAS MADE TO IMPROVE THE
MILITARY CHARACTERISTICS NOR TO ATTEMPT A MAJOR REDESIGN OF THE
FRAGMENTATION BOMB CLUSTER. THE EFFORT WAS CONCENTRATED IN PRODUCT
IMPROVEMENT, COST REDUCTION, AND THE PREPARATION OF A DESCRIPTION OF
MANUFACTURE. THE M38 (T28E2) CLUSTER CONSISTS OF (A) AN M32 (T39E2)
CLUSTER ADAPTER EQUIPPED WITH AN M144 (T172) FIN ASSEMBLY WITH A
MECHANICAL TIME FUZE AN-M146A1 OR M198 AND AN   M31 (T39) ARMING WIRE
ASSEMBLY AND (B) TWENTYFOUR CLUSTERED M128 (T17E2) 20-LB FRAGMENTATION
BOMBS ARRANGED IN 2 TIERS, WITH EXTENSIBLE BOOM   M145) TAIL ASSEMBLIES
ON THE BOMBS IN THE FORWARD TIER AND FIXED BOOM (M146) TAIL ASSEMBLIES
ON THE BOMBS IN THE AFT TIER.

269 686   0356   (*BOMBS, *FRAGMENTATION AMMUNI-TION, *BOMB CLUSTERS, BO
MB FUZES, COSTS, DESIGN, PRODUCTION.)   -
269 695   0359   MECHANISMS OF THE OXIDATION OF ORGANIC AMINES BY
OXYGEN AND BY FREE RADICAL OXIDIZING AGENTS.

269 695   0359   OXIDATION OF AMINES BY OZONE AND OTHER REAGENTS   A
STUDY OF THE OXIDATION OF TRIBUTYLAMINE BY O3 AND MNO2 WAS MADE. THE
OXIDATION PRODUCTS DEPENDED ON THE REACTION CONDITIONS. THE N-OXIDE
WAS THE MAIN PRODUCT IN SOME SOLVENTS WHEREAS ATTACK OF O3 AT THE C
NEXT TO N OCCURRED IN OTHERS. OXIDATION OF TRIBUTYLAMINE WITH MNO2
GAVE N-FORMYLDIBUTYLAMINE SIMILAR OXIDATION OCCURS WITH OTHER
TRIALKYLAMINES. OXIDATION OF AMINES BY MONOVALENT RADICALS EXAMPLES
OF THE FORMATION OF SUBSTITUTED ETHYLENE DIAMINES BY REACTION OF
TERTIARY AMINES WITH T-BUTOXY RADICALS ARE GIVEN. DEHYDROGENATIVE
COUPLING DID NOT OCCUR WHEN T-BUTOXY-RADICALS REACTED WITH
DIMETHYLANILINE IN ACETIC ACID SOLUTION. THE AMINE WAS DEMETHYLATED,
THE EJECTED C LINKING 2, THEN 3 AROMATIC RINGS TOGETHER. EVIDENCE FOR
INTERMEDIATE STEPS IN THE OVER-ALL REACTION WAS OBTAINED. REACTIONS OF
AMINES IN AQUEOUS SOLUTION WITH POLYVALENT METAL OXIDANTS   ARGENTIC

COMPOUNDS ARE UNIQUELY EFFECTIVE FOR ALIPHATIC AMINE OXIDATIONS IN
AQUEOUS MEDIA. WITH AQUEOUS SOLUTIONS OF PRIMARY AMINES, ARGENTIC
PICOLINATE GAVE ALDEHYDES OR KETONES IN 10-40% YIELD, WHILE SECONDARY
AMINES GAVE YIELDS OF 20-90%.

269 695   0357   (BUTYL RADICALS, ALKYL RADICALS, *AMINES, *ANILINES, *O
XIDATION, CHEMICAL REAC-TIONS WITH OXYGEN, OZONE, MANGANESE COMPOUNDS, D
IOXIDES, CUMENES, PEROXIDES.) (METALORGANIC COMPOUNDS, SILVER COMPOUNDS
.) (PYRIDINES, CARBOXYLIC ACIDS, ESTERS, FREE RADICALS, AL-KOXY RADICAL
S, ORGANIC SOLVENTS.) (OXIDIZERS, STEREOCHEMISTRY, MOLECULAR STRUCTURE,
 CHROMA-TOGRAPHIC ANALYSIS, SPECTROGRAPHIC ANALYSIS.)   -
269 696   0360   PROJECT LIGHTNING.

269 696   0360   WORK WAS DIRECTED TOWARD SETTING THE STAGE FOR THE
CONSTRUCTION OF A SUBSYSTEM WHICH WILL DEMONSTRATE THE FEASIBILITY OF
THE TECHNIQUES DEVELOPED DURING THE PREVIOUS PERIODS. IT WAS DECIDED
THAT THE BEST CHOICE FOR LOGIC CIRCUITRY LAY IN THE D-C DRIVEN
CLASSIFICATION. THE BROAD GROUNDWORK FOR ALL CONSTRUCTION DECISIONS
WAS MADE AND MANY DETAILED ONES HAVE BEEN FIRMED UP. INDIVIDUAL
MONOSTABLE AMPLIFIERS OF THE TYPE CONSIDERED TO BE THE BACKBONE OF THE
D-C APPROACH HAVE BEEN OPERATED AT REPETITION RATES AS HIGH AS 940 MC.
ALL THE CIRCUIT TYPES TO BE USED IN THE MEMORY WORK HAVE BEEN OPERATED
INDIVIDUALLY AND MANY HAVE BEEN PROVED BY USE IN THE NINE-WORD TEST
MEMORY.

269 696   0358   (*DATA PROCESSING SYSTEMS, *COMPUTERS.) (*ELECTRONIC
CIRCUITS, COMPUTER LOGIC, MEMORY DEVICES, DIODES.) RESEARCH PROGRAM ADM
INISTRATION.   -
269 700   0361   MANAGEMENT OF SCIENTIFIC RESEARCH. AN ASTIA REPORT
BIBLIOGRAPHY,

269 700   0361   THIS BIBLIOGRAPHY WAS PREPARED BY ASTIA IN RESPONSE
TO FREQUENT REQUESTS FOR INFORMATION CONCERNING SCIENTIFIC MANAGEMENT,
AND BECAUSE OF THE SUBJECT'S RELEVANCY TO THE DEFENSE DEPARTMENT'S
RESEARCH AND DEVELOPMENT EFFORT. REFERENCES ARE ARRANGED
ALPHABETICALLY BY SUBJECT AREAS, AND INCLUDE ENTRIES ON COST
ADMINISTRATION, COMMUNICATION OF R + D DATA, ECONOMICS, INDUSTRIAL
MOBILIZATION, PRODUCTION AND PROCUREMENT. REFERENCES ARE INCLUDED ON
THE EVALUATION AND PLANNING OF RESEARCH PROGRAMS, AS WELL AS A SECTION
ON SCIENTIFIC MANPOWER, AND A LISTING OF FOREIGN AND DOMESTIC RESEARCH
PROGRAMS. WITHIN EACH SUBJECT AREA, REFERENCES TO MILITARY REPORTS ARE
ARRANGED ALPHABETICALLY BY SOURCE AND TITLE REPORTS PUBLISHED BY
DEPARTMENT OF DEFENSE CONTRACTORS ARE CITED BY SOURCE, CONTRACT, AND
DATE. ALL CITATIONS INCLUDED ARE FOR DOCUMENTS CATALOGED BY ASTIA FROM
1953 THRU 1 JANUARY 1962.

269 700   0359   *SCIENTIFIC RESEARCH, *INDUS-TRIAL RESEARCH, *MILITARY
RESEARCH, *RESEARCH PROGRAM ADMINISTRATION, *MANAGEMENT ENGINEER-ING, EC
ONOMICS, PROCUREMENT, COSTS, INDUSTRIAL PRODUCTION, INDUSTRIAL MOBILIZAT
ION, SCIEN-TIFIC PERSONNEL, INDUSTRIAL RELATIONS, LABOR UNIONS, SYMPOSIA
, CONFERENCES, DOCUMENTATION, BIBLIOGRAPHY.   -

269 715   0362   COCKPIT CONTROL-DISPLAY SUBSYSTEM ENGINEERING,

269 715   0362   COCKPIT CONTROL-DISPLAY SUBSYSTEMS ENABLE THE HUMAN OPERATORS TO PROVIDE THEIR REQUIRED CONTROL INPUTS TO WEAPON SYSTEMS ACCURATELY AND AT THE RIGHT TIME. THESE SUBSYSTEMS MUST BE DESIGNED AS AN INTEGRAL PART OF THE TOTAL SYSTEMS. THIS REPORT PRESENTS THE CONTROL-DISPLAY SCHEDULE AS A SEQUENCE OF DESIGN ACTIVITIES. THE RELATIONSHIPS BETWEEN ACTIVITIES WITHIN CONTROL-DISPLAY DESIGN AND THE REST OF THE SYSTEM ARE SHOWN.

269 715   0360   (DESIGN OF COCKPITS, *FLIGHT INSTRUMENTS, CONTROL PANELS, *INSTRUMENT PANELS, DISPLAY SYSTEMS FOR AIRCRAFT, SPACE CAPSULES, MANNED, SATELLITE VEHICLES.)   -
269 720   0363   GROUP AND ORGANIZATIONAL FACTORS INFLUENCING CREATIVITY.

269 720   0363   NO ABSTRACT AVAILABLE

269 720   0361   (*GROUP DYNAMICS, PERSONALITY, BEHAVIOR, *LEADERSHIP, ATTITUDES, EFFECTIVE-NESS, TESTS.) (*STRESS (PSYCHOLOGY), TRAINING.)
-
269 726   0364   A SERIES EXPANSION OF THE TRUE ANOMALY,

269 726   0364   A SERIES EXPANSION OF THE TRUE ANOMALY AS A FOURIER SERIES IN THE MEAN ANOMALY IS DERIVED. THE COEFFICIENTS ARE IN A FORM DIFFERENT FROM BESSEL'S REPRESENTATION. HOWEVER, IT APPEARS THAT FOR PRACTICAL APPLICATION THERE IS NO SPECIAL ADVANTAGE TO EITHER FORM. (AUTHOR) AD-269 7269N6

269 726   0362   (*SERIES, FOURIER ANALYSIS, *CELESTIAL MECHANICS, BESSEL FUNCTIONS, SATEL-LITE VEHICLES, ORBITAL FLIGHT PATHS, FUNCTIONS, THEORY.)   -
269 750   0365   OPERATIONS RESEARCH. AN ASTIA REPORT BIBLIOGRAPHY,

269 750   0365   THIS BIBLIOGRAPHY WAS PREPARED BY ASTIA IN RESPONSE TO FREQUENT INQUIRIES CONCERNING OPERATIONS RESEARCH AND RELATED TECHNIQUES EMPLOYED IN THE SOLUTION OF MANAGEMENT AND SCIENTIFIC PROBLEMS. CITATIONS ARE INCLUDED FOR DOCUMENTS CATALOGED BY ASTIA FROM 1953 THROUGH 1 FEBRUARY 1962. ENTRIES ARE ARRANGED BY SUBJECT ACCORDING TO A SPECIFIC TECHNIQUE OR METHOD OF OPERATIONS RESEARCH, RATHER THAN A GIVEN APPLICATION OR CASE STUDY. SUBJECT AREAS INCLUDE REFERENCES PERTINENT TO DYNAMIC PROGRAMMING, GAMES THEORY, INVENTORY THEORY, LINEAR PROGRAMMING, MATHEMATICAL MODELS, REPLACEMENT THEORY, SIMULATION TECHNIQUES, AND QUEUING THEORY. REFERENCES CONCERNING MANAGEMENT ENGINEERING, PROBABILITY THEORY, AND SYSTEMS ANALYSIS ARE ALSO INCLUDED AS RELATED TECHNIQUES. WITHIN EACH SUBJECT AREA, CITATIONS TO REPORTS PUBLISHED BY DEPARTMENT OF DEFENSE CONTRACTORS ARE ARRANGED ALPHABETICALLY BY SOURCE, CONTRACT NUMBER, AND DATE REFERENCES TO MILITARY REPORTS ARE GROUPED BY SOURCE AND TITLE. A SECTION ENTITLED GENERAL REFERENCES, INCLUDES CITATIONS ON THE USE OF COMPUTERS IN SOLVING OPERATIONS RESEARCH PROBLEMS, AS WELL AS A LIST OF BIBLIOGRAPHIES, SYMPOSIA, FOREIGN REPORTS, AND MISCELLANEOUS STUDIES.

269 750   0363   *OPERATIONS RESEARCH, *GAMES THEORY, *LINEAR PROGRAMMING, MANAGEMENT EN-GINEERING, *BIBLIOGRAPHY, SYMPOSIA, LOGISTICS.   -

269 753   0366   DEVELOPMENT AND EVALUATION OF HIGH TEMPERATURE
PROTECTIVE COATINGS FOR COLUMBIUM ALLOYS.   PART II.   COATING
EVALUATION.

269 753   0366   A COMPARATIVE EVALUATION WAS MADE OF 18 COATINGBASE
METAL SYSTEMS, SIX DIFFERENT COATINGS   APPLIED TO 3 NB BASE MATERIALS
(D-31 ALLOY, F-48 ALLOY AND UNALLOYED NB).   THE 18 COATING-BASE   METAL
SYSTEMS WERE TESTED UNDER THE SAME CONDITIONS IN CYCLIC OXIDATION (2300
AND 2500 F), THERMAL SHOCK (2500 TO 250 F), BEND-OXIDATION   (2500 F)
AND STRESS-OXIDATION (2500 F) PLUS TENSILE TESTS.   THE TESTS PRODUCED
DIRECTLY COMPARABLE DATA BETWEEN THE COATING-BASE METAL SYSTEMS
RELATING TO THE PROTECTIVE NATURE OF EACH COATING AND THE EFFECT OF THE
COATING AND THE   COATING TREATMENT ON THE MECHANICAL PROPERTIES   OF THE
SUBSTRATE.

269 753   0364   (*REFRACTORY COATINGS, *NIOBIUM ALLOYS, TITANIUM ALLOYS
, MOLYBDENUM ALLOYS, TUNGSTEN ALLOYS, ZIRCONIUM ALLOYS, *NIOBIUM, HIGH T
EMPERATURE RESEARCH, *HEAT RESISTANT ALLOYS.)   (OXIDATION, EROSION, THER
MAL   STRESSES, MECHANICAL PROPERTIES.)   *OXIDATION INHIBITORS.   -
269 759   0367   RESEARCH ON ELECTRONICALLY EXCITED STATES AND THEIR
REACTIONS.

269 759   0367   SEVERAL BRIDGED-RING KETONES HAVE BEEN SYNTHESISED
HAVING DOUBLE BONDS OR AROMATIC RINGS WITH THEIR PI-ELECTRONS NEAR THE
C OF THE C O GROUP.   THEY ALL SHOW INTRAMOLECULAR CHARGETRANSFER
SPECTRA.   MOLECULES CONTAINING VERY   STRAINED CYCLOBUTANE RINGS HAVE
BEEN MADE BY PHOTOCHEMICAL ISOMERISATION.

269 759   0365   (*BENZENES, QUINONES, *POLY-CYCLIC COMPOUNDS, CYCLOBUTA
NES, *KETONES, *ELECTRON TRANSITIONS, EXCITATION, STEREO-CHEMISTRY, ISOM
ERS, SYNTHESIS, PHOTOCHEMICAL REACTIONS, DIENES.)   -
269 769   0368   INVESTIGATION OF HIGH VELOCITY IMPACT AND SOME HIGH
EXPLOSIVES PHENOMENA.

269 769   0368   A SUMMARY OF THE IMPORTANT RESULTS OBTAINED IN THIS
RESEARCH IS GIVEN.   THE SUBJECT MATTER INCLUDED   (1) HIGH EXPLOSIVE
GENERATORS FOR FAST PARTICLES   (2) MECHANISM OF CRATERING IN ULTRA HIGH
VELOCITY IMPACT   (3) OBSERVATIONS OF VAPORIZATION ACCOMPANYING ULTRA
HIGH VELOCITY   IMPACT   (4) MECHANISM FOR CRATER EXPANSION IN SHAPED
CHARGE PENETRATION   (5) IONIZATION AND ELECTRON DENSITIES IN DETONATING
SOLID EXPLOSIVES   (6) ELECTRICAL FIELDS AND ELECTROMAGNETIC RADIATION
FROM CHEMICAL DETONATIONS   (7) EXTERNAL DETONATION GENERATED PLASMAS
(8) THE EFFECT OF PRESSURE ON THE DEGREE OF IONIZATION IN GASEOUS
DETONATIONS   (9) IONIZATION AND ELECTRICAL CONDUCTIVITY AND ITS
RELATIONSHIP TO THE DEFLAGRATION TO DETONATION TRANSITION IN SOLID
EXPLOSIVES   AND (10) TRANSITION TO DETONATION IN LIQUID EXPLOSIVES.

269 769   0366   (*HYPERVELOCITY PROJECTILES, *PARTICLES, *CRATERING, IO
NIZATION, IMPACT SHOCK, SHAPED CHARGES, PENETRATION, *EXPLO-SIVES, *DETO
NATION, EXPLOSIONS, GASES, ELEC-TRONS, DENSITY, ELECTRICAL PROPERTIES,
ELECTROMAGNETIC PROPERTIES, PRESSURE, PLASMA JETS, PLASMA PHYSICS.)   (ME
TALS, PENETRATION.)   -

269 779   0369   RELATIONSHIPS BETWEEN ENERGY, FIBROSITY AND TEMPERATURE IN CHARPY IMPACT TESTS ON AISI 4340 STEEL.

269 779   0369   A STUDY WAS CONDUCTED ON THE RELATIONSHIPS BETWEEN IMPACT ENERGY, PERCENT FIBROSITY AND TEST TEMPERATURE IN THE CHARPY TESTS FOR AISI 4340 STEEL. IT IS SHOWN THAT A LINEAR FUNCTION OF PERCENT FIBROSITY VERSUS ENERGY EXISTS.   ALSO AN ENERGY VALUE (U SUB F) DERIVED FROM THIS FUNCTION IS SHOWN TO BE RELATED TO BASIC STRAINHARDENING PROPERTIES. A RELATIONSHIP, BASED UPON THE RATE OF CHANGE IN U SUB F WITH RESPECT TO TEMPERATURE, WAS ESTABLISHED. IT WAS POSSIBLE TO DESCRIBE THE APPEARANCE OF THE FRACTURE BY IDENTIFYING THREE REGIONS OF BEHAVIOR, NAMELY, SHEAR LIP, CENTER FIBROUS AND FLAT. THE FLAT REGION CAN BE CONSIDERED REPRESENTATIVE OF RAPID FRACTURE WHILE THE CENTER FIBROUS WOULD INDICATE SLOW DUCTILE FRACTURE, RAPID AND SLOW BEING DEFINED IN THIS STUDY BY UNSTABLE AND STABLE FRACTURE PROPAGATION.

269 779   0367   (*STEEL, *FRACTURE (MECHANICS), ENERGY, TRANSITION TEMP ERATURE, PLASTIC FLOW, TENSILE PROPERTIES, DEFORMATION, HARDENING, MICRO STRUCTURE, TESTS, IMPACT SHOCK.) (MARTENSITE, BAINITE, PEARLITE.)   —
269 775   0370   DESIGN OF MODEL OF A THERMOELECTRIC AIR CONDITIONING SYSTEM FOR SUBMARINES.

269 775   0370   A THERMOELECTRIC HEATING AND COOLING MODULE WAS CONSTRUCTED FOR INSTALLATION IN A WATER TO WATER AIR CONDITIONING SYSTEM ABOARD A SUBMARINE. THIS MODULE HAS A COOLING RATING OF 2550 BTU/HR. AT A COEFFICIENT OF PERFORMANCE OF 0.75 AND AN OPERATING CURRENT OF 35 AMPERES DC. THIS RATING WAS BASED ON A 85 F SINK WATER TEMPERATURE AND A CHILL WATER TEMPERATURE OF 55 F. THE UNIT WAS DESIGNED TO WITHSTAND SUBMERGENCE PRESSURES AND THE CORROSIVE EFFECT OF SEA WATER IN ALL WATER PASSAGES. IT OCCUPIES A VOLUME 1 FT. BY 1 FT. BY 3 INCHES AND WAS DESIGNED FOR EASE IN STACKING INTO LARGER CAPACITY UNITS WITHOUT ADDITIONAL SPACE BEING REQUIRED FOR COUPLING BETWEEN UNITS. IT HAS A WEIGHT OF 50 POUNDS.

269 775   0368   (*THERMOELECTRICITY, *AIR CON-DITIONING EQUIPMENT FOR * SUBMARINES, DESIGN, THEORY.) (REFRIGERATION SYSTEMS, HEAT EX-CHANGERS, THERMAL INSULATION, VIBRATION, SHOCK, TESTS.) (HEAT TRANSFER, SEA WATER , WATER, COOLING.)   —
269 778   0371   HOT ROLLING OF COMMERCIALLY PURE TITANIUM AND

269 778   0371   ROLLING FORCES AND TORQUE WERE EXPERIMENTALLY DETERMINED IN HOT ROLLING COMMERCIALLY PURE TI AND TI 6AL-4V ALLOY ON A 2-HIGH EXPERIMENTAL ROLLING MILL WITH 5-1/4 IN.-OUTSIDE DIAM ROLLS. ROLLING TEMPERATURES WERE 1400, 1600, 1800, AND 2000 F SPECIMEN WIDTHS 1, 2, AND 4 IN. AND SPECIMEN THICKNESSES 1/32, 1/16, AND 1/8 INCH. RESULTS ARE PRESENTED IN THE FORM OF CURVES SHOWING THE EFFECTS OF REDUCTION, ROLLING TEMPERATURE, SPECIMEN SIZE, AND ALLOY ON ROLL SEPARATING FORCE, SPECIFIC PRESSURE, HORSEPOWER AND WORK, FORWARD SLIP, LEVER ARM RATIO AND SPREAD.

269 778   0369   (*TITANIUM, *TITANIUM ALLOYS, PROCESSING, SHEETS, ROLLI NG MILLS, TEMPERA-TURE, PRESSURE, TORQUE, THICKNESS, REDUCTION, VELOCITY , MANUFACTURING METHODS.) (STRUC-TURES, MATERIALS.)   —

269 780   0372   DEVELOPMENT OF AN E-BAND AMPLIFIER.

269 780   0372   PROGRESS IS REPORTED ON THE ELECTRICALLY-TUNABLE
FILTER, THE PERMANENT MAGNET, AND IMPORTANT TEST EQUIPMENT. TWO TUBES
ARE UNDER FABRICATION. THE FIRST TUBE REACHED THE FINAL ALIGNMENT
STAGE, PRIOR TO GLASSING AND EXHAUST AND THE SECOND TUBE APPROACHED THE
MATCHING STAGE. THE PROTOTYPE FILTER HAD MOST ENCOURAGING INITIAL
TESTS. PERFORMANCE OVER THE FULL BAND WAS ACHIEVED WITH INSTANTANEOUS
BANDWIDTHS OF 30-80 MC AT 6-8 DB RESONANCE INSERTION LOSS. A FLEXIBLE
DIELECTRIC WAVEGUIDE WAS FABRICATED AND UTILIZED IN THE FILTER
MEASUREMENTS. INITIAL SET-UP ON THE RECEIVER (FOR LOSS AND NOISE
FIGURE MEASUREMENTS) IS DISCUSSED.

269 780   0370   (*MICROWAVE AMPLIFIERS, EXTREMELY HIGH FREQUENCY, YTTRI
UM COMPOUNDS, IRON COM-POUNDS, GARNET, *TRAVELING WAVE TUBES, *BAND-PASS
 FILTERS, TUNING DEVICES, WAVEGUIDE FILTERS, MAGNETS, TEST EQUIPMENT, N
OISE (RADIO), REDUCTION, DESIGN.)   -
269 784   0373   THE EMITTANCE OF CHROMIUM, COLUMBIUM, MOLYBDENUM,
TANTALUM, AND TUNGSTEN,

269 784   0373   A COMPILATION IS PRESENTED OF ORIGINAL TEST DATA ON
EMITTANCE, REFLECTANCE, AND ADSORPTANCE OF CR, NB, MO, TA, AND W. THE
DATA WERE TAKEN FROM THE LITERATURE PUBLISHED DURING THE PERIOD
1940-1959 INCLUSIVE, AND AS MUCH OF THE 1960 LITERATURE AS COULD BE
OBTAINED. THE FOLLOWING SOURCES WERE SEARCHED CHEMICAL   ABSTRACTS,
CERAMIC ABSTRACTS, METALLURGICAL ABSTRACTS, NUCLEAR SCIENCE ABSTRACTS,
AND THE FILES OF THE DEFENSE METALS INFORMATION CENTER 9DMICO. AN
ATTEMPT WAS MADE TO EVALUATE THESE SOURCES OF DATA ACCORDING TO THE
APPARENT THOROUGHNESS OF METHODS AND TECHNIQUES AS DESCRIBED BY THE
VARIOUS INVESTIGATORS. IN MANY CASES THE DESCRIPTIONS IN THE
LITERATURE ARE A SUMMARY OF METHODS AND RESULTS, AND A COMPLETE
EVALUATION IS IMPOSSIBLE. CURVES ARE PRESENTED WHICH APPEAR TO
INDICATE THE MOST PROBABLE VALUES FOR THE VARIOUS CONDITIONS AND
MATERIALS.

269 784   0371   (METALS AND ALLOYS OF *CHROMIUM, *MOLYBDENUM, *NIOBIUM,
 *TANTALUM, *TUNGSTEN.) (*THERMAL RADIATION, THERMIONIC EMISSION, BLACK
BODY RADIATION, HEAT TRANSFER, MONOCHRO-MATIC LIGHT, ABSORPTION, BRIGHTN
ESS, REFLEC-TION.) (TEST EQUIPMENT, THERMOCOUPLES, THERMOPILES, OPTICAL
 EQUIPMENT, RADIATION PYROMETERS, SPECTROPHOTOMETERS, THERMISTORS.) DATA
, TABLES.   -
269 786   0374   PROTEIN-PRODUCING MICROORGANISM.

269 786   0374   A PROTEIN-PRODUCING MICROORGANISM WAS RECENTLY
DISCOVERED IN THE INTESTINES OF PIGS BY IVAN OROBINSKIY AT THE
KRASNOYARSK AGRICULTURAL INSTITUTE. THE MICROORGANISM UTILIZES
NITROGEN FROM THE AIR TO PRODUCE PROTEIN. IT ALSO PRODUCES SMALL
AMOUNTS OF LACTIC ACID, VITAMINS, GROWTH HORMONES, AND ANTIBIOTICS.
THE CHIEF VALUE OF OROBINSKIY'S MICROORGANISM LIES IN ITS ABILITY TO
INCREASE THE PROTEIN CONTENT OF POTATOES FROM 1 TO 8$, OF GRAIN HUSKS
FROM 1.5 TO 9.5$, OF GROUND-UP STRAW UP TO 4$, AND OF SILAGE UP TO 2$.
FEEDING PIGLETS A PROVENDERBACTERIN, PREPARED BY INOCULATION OF POTATO
MASH BY A PURE CULTURE OF THE MICROORGANISM, INCREASED THEIR WEIGHT 70
TO 90$ OVER THAT OF CONTROL ANIMALS. MASS PRODUCTION OF OROBINSKIY'S
PROVENDER-BACTERIN IS BEING ARRANGED IN SIBERIA.

269 786   0372   (*PROTEINS, PRODUCTION, *MICRO-ORGANISMS, ALGAE, FEEDIN
G, GROWTH, NUTRITION.)   -

269 788   0375   AIR PURIFICATION IN CONFINED AREAS.

269 788   0375   THE FOLLOWING INFORMATION IS SUMMARIZED FROM
LITERATURE SOURCES   (1) AN IMPROVED METHOD FOR OBTAINING N2O2 AND KO2
BY DIRECT OXIDATION OF METAL WITH OXYGEN IS REPORTED. THE INTERACTION
OF NAO2 WITH CO2 WAS STUDIED ALL EXPERIMENTS WERE MADE IN THE PRESENCE
OF WATER VAPOR. ABOVE 25 C ALL REACTIONS RESULTED IN COMPLETE
DISCHARGE OF O AND THE FORMATION OF NA2CO3 OVER AN INTERMEDIATE PHASE
OF NAOH. BELOW 10 C ONLY SUPEROXIDE O WAS DISCHARGED PEROXIDE O
REMAINED IN THE RESULTANT COMPOUND, NA2C2O6. A PRACTICAL METHOD OF
OBTAINING NA2C2O6 WHICH CAN BE USED AS A MILD OXIDIZER IS DISCUSSED.
THE INTERACTION OF NAO2 OR KO2 WITH CO IS ALSO DISCUSSED.

269 788   0373   (*AIR, PURIFICATION.) (*ALKALI METAL COMPOUNDS, *SODIU
M COMPOUNDS, *POTASSIUM COMPOUNDS, *OXIDES, *PEROXIDES, CARBONATES, SYNT
HESIS, CHEMICAL REACTIONS, CARBON DIOXIDES, CARBON COMPOUNDS, MONOXIDES,
 WATER.) USSR, CLOSED-CYCLE ECOLOGICAL SYSTEMS.   -
269 789   0376   JOINING OF SAP (SINTERED ALUMINUM POWDER).

269 789   0376   NO ABSTRACT AVAILABLE

269 789   0374   (POWDER METALS, *ALUMINUM, *SPOT WELDING, *BRAZING, WE
LDED JOINTS, SOLDERED JOINTS, SHEETS, FILMS, OXIDES, SURFACE PROP-ERTIES
, COATINGS, METAL COATINGS, ALUMINUM ALLOYS, MANGANESE ALLOYS, EFFECTIV
ENESS AND MECHANICAL PROPERTIES OF METAL JOINTS.) (USSR, POWDER METAL
LURGY.) (SOLDERING ALLOYS, ZINC ALLOYS.) (TIN COATINGS, MELTING, CONT
ROLLED ATMOSPHERES, ARGON, ELECTRIC ARCS, ELECTRIC WELDING, RESISTANCE
, ZINC ALLOYS, COPPER ALLOYS, ALUMINUM ALLOYS.)   -
269 790   0377   CLIMATE CONTROL.

269 790   0377   NO ABSTRACT AVAILABLE

269 790   0375   (CONFERENCES ON *CONTROL OF *CLIMATE.)   METEOROLOGY.
       -
269 791   0378   USSR MISSILE AND ROCKET PROGRAM BIBLIOGRAPHY.

269 791   0378

269 791   0376   (*BIBLIOGRAPHY, *USSR, *SPACE FLIGHT, EXTRATERRESTRIAL
BASES, GUIDED MIS-SILES, ROCKETS, PROPULSION, PROPELLANTS.)   -
269 792   0379   SOVIET NUCLEAR INSTRUMENTATION AND CONTROL FOR
PROPULSION.
          NO ABSTRACT AVAILABLE

269 792   0377   (*GAMMA COUNTERS, *SCINTILLATION COUNTERS, DESIGN.)   (G
AS FLOW, MEASUREMENT, *FLOWMETERS, DESIGN.) (*HETEROGENEOUS REAC-TORS,
NUCLEAR REACTIONS, REACTOR REACTIVITY, CRITICAL ASSEMBLIES, REACTOR THEO
RY.) (NUCLEAR POWER PLANTS, *FUEL ELEMENTS, RADIOACTIVE WASTE.) (LOW P
RESSURE RESEARCH, *PNEUMATIC SERVOMECHANISMS, AUTOMATIC, CONTROL SYSTEMS
, DESIGN.) (*LIQUID METALS, HEAT TRANSFER, TURBULENT FLOW, FLUID FLOW I
N PIPES.)   -
269 794   0380   SOVIET LITERATURE ON LIFE SUPPORT SYSTEMS.

269 794   0380   NO ABSTRACT AVAILABLE

269 794   0378   (*SCIENTIFIC REPORTS, *USSR, *SPACE FLIGHT, MANNED, LAB
ORATORY ANIMALS.) (CLOSED-CYCLE ECOLOGICAL SYSTEMS, STRESS (PHYSIOLOGY),
 STRESS (PSYCHOLOGY), WEIGHT-LESSNESS, RADIATION EFFECTS, RADIATION DAMA
GE, TELEMETERING DATA.)   —
269 797   0381   BASIC STUDIES IN MAGNETOHYDRODYNAMICS.

269 797   0381   RESEARCH WAS DIRECTED TOWARD OBTAINING A BASIC
UNDERSTANDING OF MAGNETOHYDRODYNAMICS. THE INITIAL STUDIES LED TO
THREE POSSIBLE APPLICATIONS FOR MAGNETOHYDRODYNAMICS WHICH IN TURN LED
TO THREE CATEGORIES OF RESEARCH. THE FIRST APPLICATION APPEARED IN
CONNECTION WITH THE PROBLEM OF HIGH-ALTITUDE, VERY HIGH VELOCITY FLIGHT
WHICH WE CALL FIGHT MAGNETOHYDRODYNAMICS. THE SECOND APPLICATION WAS
PLASMA PROPULSION. THE THIRD CATEGORY WAS THE PRODUCTION OF A VERY
HIGH TEMPERATURE COLLISION-FREE PLASMA.

269 797   0379   (*MAGNETOHYDRODYNAMICS, GAS FLOW, *MAGNETIC FIELDS, *CO
NFIGURATION, DRAG, LIFT, ELECTRON BEAMS, ELECTRON GUNS, HYDROGEN,   ARGON
.) (*PLASMA PHYSICS, PROPULSION, GAS IONIZATION, EXHAUST GASES, VELOCIT
Y, ROCKETS, HEATING, SPECIFIC IMPULSE.) (*HIGH TEMPERA-TURE RESEARCH, S
OCK TUBES, THERMONUCLEAR REAC-TIONS, ELECTRIC POWER PRODUCTION, HEAT EX
HOCK TUBES, THERMONUCLEAR REAC-TIONS, ELECTRIC POWER PRODUCTION, HEAT EX
-CHANGERS, INFRARED DETECTORS, MEASUREMENT, HEAT TRANSFER, SHOCK WAVES.
)   —
269 815   0382   AERODYNAMIC CRITERIA FOR OPTIMUM DESIGN OF MIXEDFLOW
IMPELLERS-FINAL EVALUATION.

269 815   0382   EFFORT WAS MADE TO ESTABLISH AERODYNAMIC DESIGN
CRITERIA FOR HIGH-PRESSURE-RATIO, TRANSONIC, MIXED-FLOW IMPELLERS.
RESULTS ARE GIVEN ON TWO IMPELLERS. FOR EACH IMPELLER EXTENSIVE
AMOUNTS OF INLET AND EXIT SURVEY DATA, AS WELL AS SHROUD AND OVER-ALL
DATA, ARE PRESENTED AND DISCUSSED. THE BOUNDARY LAYER DEVELOPMENT WAS
STUDIED ALONG THE BLADE SURFACE FOR SEVERAL IMPELLERS AT SEVERAL
SPEEDS. RESULTS ARE COMPARED WITH OVER-ALL IMPELLER MEASURED
PERFORMANCE. THE STUDY PROVIDES QUANTITATIVE MEANS OF EVALUATING BLADE
LOADINGS AND PROVIDES SOME INSIGHT AS TO THE DISTRIBUTION OF THE LOSSES
AND THE MAGNITUDE OF THE VISCOUS CLOGGING ALLOWANCE. AN EVALUATION IS
MADE OF DESIGN PROCEDURE IN THE LIGHT OF TEST RESULTS. A COMPARISON
AND CORRELATION OF THE RESULTS FOR ALL IMPELLERS IS MADE SO AS TO
FORMULATE DESIGN CRITERIA. A RATIONAL APPROACH IS DEVELOPED, AIMED AT
MINIMIZING CENTRIFUGAL IMPELLER AND DIFFUSER LOSSES.

269 815   0380   (*IMPELLERS, *MIXED FLOW COM-PRESSOR, HIGH PRESSURE COM
PRESSOR, HIGH PRES-SURE COMPRESSOR BLADES, PRESSURE, TRANSONICS, CONFIGU
RATION, AERODYNAMICS, DESIGN, THEORY, MATHEMATICAL ANALYSIS, TESTS.)
—
269 614   0383   NO TITLE AVAILABLE

269 614   0383   NO ABSTRACT AVAILABLE

269 614   0381   (*ROCKET RESEARCH, *GUIDED MIS-SILE RESEARCH.) (*GUIDE
D MISSILES, *BOOSTER ROCKETS, *ROCKETS, ROCKET ASSISTED PROJECTILES, ANT
IAIRCRAFT AMMUNITION, AIRCRAFT AMMUNITION, AIRCRAFT TORPEDOES, FRAGMENTA
TION AMMUNITION, UNDERWATER ROCKETS, DESIGN, LAUNCHING.) (*ROCKET PROPE
LLANTS, LIQUID ROCKET PROPEL-LANTS, SOLID ROCKET PROPELLANTS, PROPELLANT
 GRAINS, COMBUSTION, CHEMICAL PROPERTIES, PHYSI-CAL PROPERTIES, THERMODY
NAMICS.) (ROCKETS, COMBUSTION CHAMBERS, EXHAUST GASES, DISSOCIA-TION.)
 (GUIDED MISSILES, ROCKETS, LAUNCHING.)   —

269 618   0384 NO TITLE AVAILABLE

NO ABSTRACT AVAILABLE

269 618   0382   (*FORGING, *MACHINES, *FORGE PRESSES, METAL FORMING PRE
SSES, METAL FORMING BRAKES, PRODUCTION, PROCESSING, MANUFACTURING METHOD
S, *INDUSTRIAL EQUIPMENT.) (HAMMERS, EXTRUSION, ROLLING MILLS.) USSR.

269 619   0385   SYNTHESIS AND INVESTIGATION OF HIGH-MOLECULARWEIGHT
TERTIARY AMINES AND QUATERNARY AMMONIUM COMPOUNDS FROM COPOLYMERS OF
2-METHYL-5-VINYLPYRIDINE AND VARIOUS CROSS-LINKING AGENTS,

269 619   0385   THE MECHANISM AND CONDITIONS OF COPOLYMERIZATION OF
2-METHYL-5-VINYLPYRIDINE WITH DIVINYLBENZENE AND WITH TRIETHYLENEGLYCOL
DIMETHACRYLATE WAS INVESTIGATED. FURTHER CHEMICAL CONVERSIONS OF THE
SYNTHESIZED HIGH-MOLECULAR-WEIGHT TERTIARY AMINES PRODUCED QUATERNARY
AMINE COMPOUNDS INSOLUBLE IN WATER AND ORGANIC SOLVENTS. THE
SYNTHESIZED PRODUCTS WERE SUBJECTED TO VARIOUS PHYSICOCHEMICAL TESTS
(THE CAPACITY FOR ANIONIC EXCHANGE, CHEMICAL STABILITY, WATER
ABSORPTION, SWELLING CAPACITY IN ORGANIC SOLVENTS, ETC.).

269 619   0383   (METHYL RADICALS, VINYL RADI-CALS, *PYRIDINES, POLYMERI
ZATION, *COPOLYMERI-ZATION WITH BENZENES AND ETHYLENES, GLYCOLS, ACRYLIC
 RESINS, POLYMERS, CHEMICAL REACTIONS, ALKYL RADICALS, *AMINES.) (*ION
EXCHANGE RES-INS, SYNTHESIS, PHYSICAL PROPERTIES, CHEMICAL PROPERTIES.)
 USSR.   -
269 628   0386   HEAT EXCHANGE AT THE FRONTAL POINTS OF BLUNT BODIES
WASHED BY A SUPERSONIC GAS FLOW,

269 628   0386

269 628   0384   (*BLUNT BODIES, AERODYNAMICS, SUPERSONICS, AERODYNAMIC
HEATING, HEAT TRANS-FER, MATHEMATICAL ANALYSIS, USSR.)   -
269 672   0387   INVESTIGATION OF INSTRUMENTATION AND TECHNIQUES FOR
ARMY WEATHER OBSERVATION.

269 672   0387   DURING THE PAST TWO YEARS, THE PRESENCE OF A
WEATHER RADAR SET AN/CPS-9 MADE POSSIBLE A PROGRAM OF OBSERVATION OF
WEATHER PHENOMENA FROM PEAKS OF THE OREGON COAST RANGE NEAR CORVALLIS.
THE RESULTS OF THE PROGRAM AND SOME POSITIVE RECOMMENDATIONS BASED UPON
THE EXPERIENCE AND STUDY MADE POSSIBLE WITH THIS EQUIPMENT ARE
PRESENTED.

269 672   0385   (*METEOROLOGICAL RADAR, METEOR-OLOGICAL DATA.) (ARMY O
PERATIONS, WEATHER FORECASTING, RADAR ECHO AREAS, METEOROLOGICAL RADAR.)
 -

269 129   0388   PERFORMANCE OF VERTICAL AXIS (CYCLOIDAL) PROPELLERS
CALCULATED BY TANIGUCHI'S METHOD,

269 129   0388   A METHOD PROPOSED BY TANIGUCHI WAS USED TO COMPUTE
THE PERFORMANCE CHARACTERISTICS OF VERTICAL AXIS PROPELLERS HAVING
CYCLOIDAL BLADE MOTION AND SEMI-ELLIPTIC BLADES. NUMERICAL RESULTS OF
THRUST AND TORQUE COEFFICIENT AND EFFICIENCY ARE PRESENTED FOR A WIDE
RANGE OF ADVANCE COEFFICIENTS, MAXIMUM BLADE ANGLE, AND BLADE
SOLIDITY. GOOD AGREEMENT BETWEEN THE EXPERIMENTAL PERFORMANCE AND THE
COMPUTED RESULTS IS OBTAINED FOR 2, 3, AND 6-BLADED CYCLOIDAL
PROPELLERS.

269 129   0386   (*MARINE PROPELLERS, ROTATION, TESTS, MATHEMATICAL ANAL
YSIS.) (*PROPELLER BLADES, *CYCLOIDAL PROPELLERS, THEORY.)   -
269 161   0389   BEAT AMPLIFIER,

269 161   0389   EFFORTS ARE PRESENTED ON THE STUDY OF A BEAT
AMPLIFIER. A LINEAR THEORY FOR A SELECTIVE ACTIVE TRI-POLE WITH
COMPLEX PARAMETERS WAS DEVELOPED. THE INTRODUCTION OF THE STABILITY
FACTOR K RESULTED IN THE CHARACTERIZATION OF THE GAIN, BAND WIDTH,
EFFECT OF GAIN AND BAND WIDTH, THE ZONE OF PERIODIC OSCILLATIONS
INDEPENDENT FROM THE CIRCUIT STRUCTURE AND THE OPTIMUM EXTERNAL
PARAMETERS. INVESTIGATION OF A BEAT AMPLIFIER IS OF PRIMARY IMPORTANCE
IN TELECOMMUNICATIONS PRACTICE SINCE IT CAN AMPLIFY EXTREMELY WEAK
PULSED SIGNALS. A FURTHER ADVANTAGE IS THE EVIDENT FREQUENCY REDUCTION
IN THE INPUT CIRCUIT. THE LINEAR THEORY OF AN ACTIVE TRI-POLE WITH
COMPLEX PARAMETERS SHOWS THAT THE PROBLEM OF IMPEDANCE ACCOMMODATIONS
CAN BE QUITE EASILY SOLVED BY EQUAL LINES OF OPERATIONAL GAIN CAUSED BY
THE INTRODUCTION OF ORIGINAL ACTIVE QUADRIPOLES WITH REAL PARAMETERS.
ON THE BASIS OF DEFINITE SIMPLIFIED ASSUMPTIONS, CONDITIONS WERE
DERIVED WHICH ARE USEFUL IN THE REALIZATION OF CONVENTIONAL NEUTRALIZED
AND BEAT AMPLIFIERS.

269 161   0387   (*PARAMETRIC AMPLIFIERS, *FEED-BACK AMPLIFIERS, RADIOFR
EQUENCY OSCILLATIONS, IMPEDANCE, RESISTANCE, INDUCTANCE, THEORY, MATHEMA
TICAL ANALYSIS.) (*COMMUNICATION EQUIPMENT, ELECTRONIC CIRCUITS, USSR.)
-
269 163   0390   AN ATLAS OF INFRARED SPECTRA OF FLAMES. PART
I. INFRARED SPECTRA OF HYDROCARBON FLAMES IN THE 1-5 MICRON REGION,

269 163   0390   AN EXPERIMENTAL COMBUSTION SYSTEM AND INFRARED
INSTRUMENTATION WERE SET UP TO MEASURE INFRARED EMISSION AND ABSORPTION
SPECTRA OF FLAMES UNDER CONTROLLED CONDITIONS. INFRARED SPECTRA OF
HYDROCARBON-OXYGEN FLAMES WERE MEASURED IN THE 1 - 5 MICRON REGION, AT
ATMOSPHERIC PRESSURE. SPECTRAL EMISSIVITIES AND SPECTRAL RADIANT
EMITTANCES WERE CALCULATED FROM THE MEASUREMENTS AND PLOTTED AS
FUNCTIONS OF WAVELENGTH. TEMPERATURES WERE DETERMINED FROM THE
SPECTRAL DATA BY THE INFRARED MONOCHROMATIC RADIATION METHOD, AT
VARIOUS WAVELENGTHS. RESULTS SHOW ONLY MODERATE DEPENDENCE OF
INFRARED RADIANCE ON FUEL COMPOSITION PER SE, BUT STRONG DEPENDENCE
UPON TEMPERATURE AND TEMPERATURE DISTRIBUTION. THESE RESULTS ARE IN
ACCORD WITH EXPECTATIONS, BASED ON MEASUREMENTS OF RADIATION FROM
HEATED GAS SAMPLES AND ON CALCULATIONS OF MOLECULAR ENERGY
DISTRIBUTIONS.

269 163   0388   (*FLAMES, *INFRARED SPECTROS-COPY, EXHAUST GASES, COMBU
STION CHAMBERS, INFRARED RADIATION, ABSORPTION, MEASUREMENT, HYDROCARBON
S, OXYGEN.) (ATMOSPHERE, PRESSURE, TEMPERATURE, ATOMIZATION, TESTS.) (
INSTRU-MENTATION, OPTICAL EQUIPMENT, MONOCHROMATIC LIGHT, COLLIMATORS, I
NFRARED LAMPS, BLACKBODY RADIATION.)   -
269 180   0391   SOLAR THERMOELECTRIC GENERATORS FOR APPLICATION
OUTSIDE THE EARTH'S ATMOSPHERE.

269 180   0391   RESULTS ARE PRESENTED OF A BASIC RESEARCH PROJECT IN
TWO PHASES TO DETERMINE FEASIBILITY OF SOLAR THERMOELECTRIC GENERATORS
OUTSIDE OF THE EARTH'S ATMOSPHERE. IT WAS CONCLUDED THAT SIMULTANEOUS
SOLUTIONS OF TWO PROBLEMS ARE REQUIRED (1) SOLAR ENERGY COLLECTION
AND HEAT SINK RADIATION EFFICIENCY MUST BE AS HIGH AS POSSIBLE TO
OBTAIN THE WIDEST POSSIBLE TEMPERATURE DIFFERENCE BETWEEN THE HOT AND
COLD JUNCTIONS OF THE THERMOELECTRIC GENERATOR. USING SELECTIVE
ABSORBING AND RADIATING SURFACES ON FLAT-PLATE COLLECTORS, AND 10- TO
20-FOLD CONCENTRATING COLLECTORS, A TEMPERATURE DIFFERENCE OF 200 TO
520 C CAN BE REACHED WITH A COLLECTION EFFICIENCY IN EXCESS OF 50$ AND
(2) THERMOELECTRIC EFFICIENCY WITH MATERIALS PRESENTLY AVAILABLE CAN
REACH 9$ EFFICIENCY WITH A FACTOR OF MERIT Z   0.002 PER C. WITH Z
0.004, AN EFFICIENCY OF 19$ COULD BE ATTAINED AT 500 C TEMPERATURE
DIFFERENCE. FLATPLATE AND ORIENTED CONCENTRATING COLLECTORS ARE ALSO
DISCUSSED.

269 180   0389   (*THERMOELECTRICITY, GENERATORS, *POWER SUPPLIES, *ELEC
TRIC PROPULSION, *SOLAR ENERGY, SPACE ENVIRONMENTAL CONDITIONS, THER-MOC
OUPLES, ALLOYS, SEMICONDUCTORS, MATERIALS, REFLECTORS, HEAT TRANSFER, EL
ECTRIC POWER PRO-DUCTION, AIRBORNE, EFFECTIVENESS, FEASIBILITY STUDIES.)

269 215   0392   NO TITLE AVAILABLE

269 215   0392   NO ABSTRACT AVAILABLE

269 215   0390   (*ELECTRONIC EQUIPMENT, *ELEC-TRONIC CIRCUITS, TRANSIST
ORS, AMPLIFIERS.) (OSCILLATORS, DIODES, PARAMETRIC AMPLIFIERS, FREQUENCY
 MULTIPLIERS, *MICROWAVE EQUIPMENT.) (PLASMA PHYSICS, ELECTRON TUBES, WA
VE TRANS-MISSION.) (ELECTROMAGNETIC THEORY, ELEC-TROMAGNETIC WAVES, PRO
PAGATION, ANTENNAS.) (MASERS, CONTROL SYSTEMS, DATA PROCESSING SYSTEMS.)

269 230   0393   GG87 SPIN-MOTOR ROTATION DETECTOR MECHANIZATION AND
EVALUATION.

269 230   0393   THE METHODS ARE DESCRIBED BY WHICH A GG87B WIDEANGLE
MINIATURE INTEGRATING GYRO WAS ALTERED TO INCLUDE A SPIN-MOTOR
ROTATION MONITORING DEVICE. TEST DATA FROM THE EVALUATION PROGRAM ARE
ALSO INCLUDED. THE SPIN-MOTOR RUNNING DETECTOR ADDITION CONSISTS OF 4
PERMANENT MAGNETS EMBEDDED IN THE SPIN-MOTOR MOMENTUM RING AND 2
WIRE-WOUND COILS ON THE GYRO CASE. THE SYSTEM IS DESIGNED TO PRODUCE A
SINE WAVE OUTPUT OF 2 CYCLES PER MOTOR REVOLUTION, OR 800 CPS. THE
AMPLITUDE OF THE 800-CYCLE SIGNAL PRODUCED BY THIS GYRO WAS 600
MILLIVOLTS RMS INTO A 10,000OHM RESISTIVE LOAD. THE GYRO WAS GIVEN THE
CUSTOMARY PERFORMANCE TESTS AND MET ALL THE REQUIREMENTS.

269 230   0391   (*GYROSCOPES, *SIGNAL GENERATORS, MINIATURE ELECTRONIC
EQUIPMENT, ROTATION, SPIN, MONITORS, DETECTORS, MAGNETS, DESIGN, SENSIT
IVITY, RELIABILITY, TESTS.)   -
269 247   0394   GYRO TEMPERATURE CONTROL WITH A LIQUID SOURCE,

269 247   0394   THE THERMAL AND FLUID CONDITIONS THAT EXIST IN THE
TEST GIMBAL AND FLUID JACKET ARE DESCRIBED. FLUID FLOW RATES IN THE
FLUID JACKET CLOSELY GOVERN THE GYRO HEAT TRANSFER PERFORMANCE AND
IMPROVEMENTS IN THIS FLOW RATE WILL SUBSTANTIALLY RAISE THIS
PERFORMANCE. COUPLED TO THIS IS THE CLOSE ATTENTION THAT MUST BE PAID

TO ALL HEAT TRANSFER PARAMETERS ABOUT THE TEST GIMBAL, EVIDENCED BY THE
CHANGES IN THE SURROUNDING INSULATION. SEVERAL IMPROVEMENTS ARE NEEDED
TO YIELD TEST CONDITIONS THAT FULLY SIMULATE SYSTEM CONDITIONS.
NOTABLE AMBIENT SENSITIVITIES ARE STILL PRESENT IN THE TEST UNIT.
FLUID TEMPERATURE LOSS-GAIN PROFILES, SHOWS THAT THE THERMAL CONDUCTION
LOSSES OF THE GYRO MOUNTINGS ARE GREAT ENOUGH TO PREVENT ANY FLUID
TEMPERATURE GAIN WITH POWER ON. THIS SITUATION CAN BE CORRECTED BY
INSTALLING SMALL AUXILIARY HEATERS ON THE GYRO MOUNTING BLOCKS TO MAKE
UP FOR THESE CONDUCTION LOSSES. THE SECOND CORRECTABLE CONDITION
INVOLVES THE TEMPERATURE CONTROLLER SENSITIVITIES AND TIME CONSTANTS.
EXPERIENCE HAS SHOWN THAT THESE FACTORS ARE NOT IN LINE WITH SIMILAR
TYPES OF CONTROL UNITS. ONLY WITH A PRECISE DESCRIPTION OF ALL THE
THERMAL CONDITIONS IN BOTH THE LABORATORY TEST UNIT AND THE SYSTEM CAN
THE REQUIRED ACCURACIES OF GYRO INSTRUMENTS BE REALIZED IN OPERATIONAL
SYSTEMS.

269 247   0392   (LIQUIDS, HEAT TRANSFER, *GIM-BALS, TEMPERATURE CONTROL
, *GYROSCOPES.) (BOUNDARY LAYER, FLUID FLOW, HEAT, HEAT TRANS-FER, TEST
METHODS.)   -
269 249   0395   COMPENSATION OF A DIGITAL INTEGRATING ACCELEROMETER.

269 249   0395   COMPENSATION OF A DIGITAL INTEGRATING ACCELEROMETER,
NECESSITATED BY THE UNUSUAL MODING BEHAVIOR OF A NONLINEAR SAMPLED-DATA
SYSTEM, IS PRESENTED. WITH THE SYSTEM COMPENSATED, HIGHEST FREQUENCY
LIMIT CYCLES ARE ESTABLISHED AND SYSTEM ERRORS ARE MINIMIZED. A NEW
CONFIGURATION IS PROPOSED USING A CONVENTIONAL TORQUE GENERATOR
MICROSYN AS BOTH A TORQUING AND SENSING DEVICE. THE MICROSYN IS
COMMANDED BY A FLIP-FLOP. THIS PULSED MICROSYN ALSO PRESENTS A
CONVENIENT AND EASY METHOD FOR ATTAINING THE COMPENSATION. REAC
SIMULATION IS USED TO DEMONSTRATE THE EFFECT OF THE COMPENSATION AND TO
ILLUSTRATE THE SYSTEMS' DYNAMIC BEHAVIOR. CROSS-COUPLING ERROR IS
INVESTIGATED TO DETERMINE IF ANY APPRECIABLE ERROR IS INTRODUCED. A
PURE SAMPLED-DATA APPROACH IS PRESENTED TO SHOW A NEW METHOD OF
ANALYSIS. THE NONLINEAR DIFFERENCE EQUATION OF THE COMPENSATED SYSTEM
IS DERIVED. ACCELERATION COMMANDS ARE GIVEN TO THE SYSTEM WITH AND
WITHOUT COMPENSATION AND THE RESULTANT ERROR IN THE INDICATED VELOCITY
IS PLOTTED.

269 249   0393   (*INERTIAL GUIDANCE, ACCELER-OMETERS, DIGITAL SYSTEMS,
FEEDBACK, ERRORS.) (MEASUREMENT, VELOCITY, *DIGITAL COMPUTERS.) (*TRANSD
UCERS, TORQUE.) THESES.   -
269 252   0397   THE STABILITY OF THE PINCH WITH ANISTROPIC PRESSURE,

269 252   0397   A DISPERSION EQUATION IS OBTAINED FOR THE STABILITY
OF THE PINCH FROM THE HYDROMAGNETIC EQUATIONS SUPPLEMENTED BY AN
EQUATION FOR THE PRESSURE TENSOR OF THE IONS. THE DISPERSION EQUATION
IS OBTAINED FOR THE MARGINAL INSTABILITY CASE ONLY. IT IS OBSERVED
THAT THIS DISPERSION EQUATION COINCIDES WITH THE DISPERSION EQUATION
OBTAINED FROM THE CHEW, GOLDBERGER AND LOW (PRO. ROY. SOC. A236 (1956)
112) EQUATIONS FOR THE MARGINAL INSTABILITY CASE. IT IS CONCLUDED THAT
THE REGION OF THE STABILITY PREDICTED FROM THE EQUATIONS THAT WE HAVE
USED IS SLIGHTLY MORE THAN THAT GIVEN BY THE KINETIC EQUATION USED BY
CHANDRASEKHAR, KAUFMANN AND WATSON (PROC. ROY. SOC. A245 (1958) 435).

269 252   0395   (*MAGNETIC PINCH, *STABILITY, *PLASMA PHYSICS, PRESSURE
.) (MAGNETIC FIELDS, VACUUM SYSTEMS, METALS, CYLINDRICAL BODIES, THERMA
L CONDUCTIVITY.) (PERTURBATION THEORY, PARTIAL DIFFERENTIAL EQUATIONS,
LINEAR SYSTEMS, TENSOR ANALYSIS, SCATTERING.)   -

269 255   0398   COMPATIBLE TECHNIQUES FOR INTEGRATED CIRCUITRY.

269 255   0398   INVESTIGATIONS WERE CONTINUED ON THE DEVELOPMENT OF
PROCESS TECHNIQUES NECESSARY FOR INTEGRATED CIRCUIT FABRICATION.
EFFORT WAS BOTH IN MORPHOLOGICAL AREAS AND THIN FILMS AS APPLIED TO
SEMICONDUCTING SUBSTRATE. FURTHER EFFORTS IN PERFECTING EPITAXIAL
TECHNIQUES ARE REPORTED. A PROGRAM WAS STARTED TO DEVELOP AND
FABRICATE TYPICAL CIRCUITS PRACTICAL FOR A WIDE RANGE OF HIGH AND LOW
FREQUENCY AMPLIFIER APPLICATIONS AS WELL AS LOGIC CIRCUITS.

269 255   0396   (*ELECTRONIC CIRCUITS, *THIN CIRCUITS, DESIGN, PROCESSI
NG, *MANUFACTURING METHODS.) (RESISTORS, CAPACITORS, TANTALUM CAPACITOR
S, INTERMETALLIC COMPOUNDS, CRYS-TALS, GROWTH, CIRCUITS.)   –
269 257   0399   ANPP CORROSION PROGRAM. LOOP TESTING OF INCONEL,
NICKEL, MONEL AND BIMETAL HEAT EXCHANGERS,

269 257   0399   CORROSION TESTS WERE PERFORMED ON 12 TEST VESSELS.
TWO SETS OF MODEL HEAT EXCHANGERS (A SET CONSISTS OF A STEAM GENERATOR
AND SUPERHEATER) AND EIGHT MINIATURE HEAT EXCHANGERS WERE TESTED
DYNAMICALLY IN A PRESSURIZED WATER LOOP. ONE SET OF MODEL HEAT
EXCHANGERS HAD BIMETAL TUBES (STAINLESS STEEL IN THE PRIMARY, CARBON
STEEL IN THE SECONDARY) AND THE OTHER HAD INCONEL TUBES. THE SET WITH
BIMETAL TUBES WAS SERVICE TESTED FOR 4890 AND THAT WITH INCONEL TUBES
WAS SERVICE TESTED 4747 HR. THE SECONDARY ENVIRONMENT IN THE BIMETAL
VESSELS SIMULATED THE SM-1 WATER CONDITIONS WHILE THE SECONDARY IN THE
INCONEL VESSELS SIMULATED REACTOR QUALITY WATER. THE INCONEL, NICKEL
AND MONEL TUBING PERFORMED WELL IN BOTH REACTOR GRADE AND HIGH CHLORIDE
SECONDARY WATER. THE INCONEL TUBING IN THE MODEL VESSELS EXPOSED TO
REACTOR GRADE WATER DID NOT PIT. THE BIMETAL MODEL VESSELS WHICH WERE
TESTED USING REACTOR GRADE WATER SHOWED THE DEGREE OF PITTING WAS
PROHIBITIVE FOR LONG-LIFE STEAM GENERATORS. TUBING IN ONE OF THE
BIMETAL MINIATURE VESSELS WAS DEFECTED TO EXPOSE STAINLESS STEEL TO THE
HIGH CHLORIDE SECONDARY ENVIRONMENT NO CRACKING OF THE STAINLESS
SUBLAYER OCCURRED. (AUTHOR) AD-269 2579N6

269 257   0397   (*NUCLEAR PROPULSION, *HEAT EX-CHANGERS, STEAM, GENERAT
ORS, METALS, PIPES, PRODUCTION, PROCESSING, MODEL TESTS, TEST METHODS, D
ESIGN.) (*CORROSION, EROSION, PICK-LING, DETERIORATION, CRAZING.) (STAIN
LESS STEEL, *STEEL, *NICKEL ALLOYS, *CHROMIUM AL-LOYS, *NICKEL.) (FEED W
ATER WITH CHLORIDES, SODIUM COMPOUNDS, HYDROXIDES, PHOSPHATES.)   –
269 261   0400   INVESTIGATION OF SPOT WELDING CHARACTERISTICS OF
TITANIUM ALLOYS,

269 261   0400   THE FATIGUE STRENGTH OF MULTIPLE SPOT WELDED JOINTS
IN .060-IN.-THICK SHEET MATERIAL OF THE TI ALLOYS 4AL-3MO-1V,
16V-2.5AL, AND 6AL-4V WERE DETERMINED. THE FATIGUE STRENGTH OF THE 3
ALLOYS WAS 8-10$ OF THE STATIC STRENGTH OF THE SPOT WELDED JOINT. THE
ALPHA-BETA ALLOY 4AL3MO-1V HAD THE HIGHEST FATIGUE STRENGTH THE
16V-2.5AL, ALL BETA ALLOY, THE LOWEST. DATA IS ALSO PRESENTED ON THE
ELEVATED TEMPERATURE STRENGTH OF SPOT WELDS AND THE EFFECT OF EXPOSURE
TO ELEVATED TEMPERATURE ON ROOM TEMPERATURE STRENGTH OF SPOT WELDS IN
THE 4AL-3MO-LV ALLOY. A UNIFORM DECREASE IN SHEAR STRENGTH WAS NOTED
WITH INCREASE IN TEMPERATURE. AT AN EXPOSURE TEMPERATURE OF 600 F, THE
4AL-3MO-1V ALLOY RETAINED ITS STRENGTH UP TO 250 HR EXPOSURE TIME. A
UNIFORM DECREASE IN SHEAR STRENGTH OCCURRED AFTER EXPOSURE AT 900 F FOR
100 HR, BUT AN ANOMALOUS INCREASE IN STRENGTH OCCURRED AFTER EXPOSURE
OF 1000 HR.

269 261   0398   (*TITANIUM ALLOYS, ALUMINUM ALLOYS, MOLYBDENUM ALLOYS,
VANADIUM ALLOYS, SHEETS, SPOT WELDING, *SPOT WELDS, *WELDED JOINTS, TENS
ILE PROPERTIES, SHEAR STRESSES, THERMAL STRESSES, HIGH TEMPERATURE RESEA
RCH, FATIGUE (MECHANICS), TESTS.)   -
269 265   0401   THERMODYNAMIC PROPERTIES OF BI-METALLIC POWDERS.

269 265   0401   THE OBJECT OF THE PROGRAM IS TO STUDY THE HEATS OF
COMBUSTION OF INTERMETALLIC COMPOUNDS AS COMPARED WITH MECHANICAL
MIXTURES OF THE CORRESPONDING METALS. THE PROGRAM WILL CONSIST OF
THREE PARTS PREPARATION OF ULTRAFINE POWDERS, BIMETALLIC ALLOY
(COMPOUND) SYSTEMS, AL B, ZR AL, ZR SI, AL LI, AND TI SI, AND OF THE
CORRESPONDING ELEMENTS DETERMINATION OF THE HEATS OF FORMATION OF THE
ABOVE BINARY COMPOUNDS AND THE OXIDES AND RELATED PRODUCTS OF
COMBUSTION OF THE ABOVE BINARY ALLOYS THE PREPARATION OF RESEARCH
QUANTITIES FOR FURTHER EVALUATION. A PARR SERIES $1200 ADIABATIC
CALORIMETER WAS INSTALLED, AND ITS HEAT EQUIVALENT DETERMINED. A FEW
PRELIMINARY RUNS ON THE DETERMINATION OF THE HEAT OF COMBUSTION OF AL
METAL POWDER REVEALED THAT THIS REACTION IS VERY VIOLENT. A FEW RUNS
WERE MADE TO EXPLORE THE FIELD OF SOLUTION CALORIMETRY. IT WAS FOUND
THAT AL POWDERS ARE SLOW TO REACT WITH 1 N HCL AT ROOM TEMPERATURE.
ONLY AT TEMPERATURES EXCEEDING 55 C DID REACTION RATES BECOME HIGH
ENOUGH TO COMPLETE THE REACTION IN THE COURSE OF MINUTES.

269 265   0399   (*THERMODYNAMICS, THERMOCHEMIS-TRY, *COMBUSTION, *POWDE
R METALS, POWDER ALLOYS, *INTERMETALLIC COMPOUNDS, METALS.) (SILICON COM
POUNDS, ALUMINUM COMPOUNDS, BORIDES, ZIRCONIUM COMPOUNDS, LITHIUM COM-PO
UNDS, TITANIUM COMPOUNDS.) (ALUMINUM, HYDRACHLORIC ACID.) (LABORATORY
EQUIPMENT, CALORIMETERS, VAPORIZATION, ELECTRON BEAMS, INDUCTION HEATING
, REFRACTORY MATERIALS.)   -
269 267   0402   ATOLL RESEARCH BULLETIN NO. 85.

269 267   0402   SINCE LAND TENURE PROBLEMS ARE OF MAGNITUDE AND ARE
UBIQUITOUS, IT WAS FELT THAT COMPARATIVE STUDIES FROM SEVERAL PARTS OF
THE PACIFIC MIGHT BE USEFUL. WESTERNIZED AREAS SUCH AS HAWAII, NEW
ZEALAND, AND AUSTRALIA WERE EXCLUDED FROM CONSIDERATION, AND AN ATTEMPT
WAS MADE TO OBTAIN CONTRIBUTIONS FROM THE GILBERT AND MARSHALL ISLANDS
IN MICRONESIA, FROM THE SOLOMON AND FIJI ISLANDS IN MELANESIA, AND
FROM THE COOK ISLANDS IN POLYNESIA.

269 267   0400   (PACIFIC ISLANDS, MAPS.) (*MEL-ANESIA, *MICRONESIA, *P
OLYNESIA.) SOCIOLOGY.   -
269 521   0403   RESEARCH IN SATELLITE TRACKING TECHNIQUES AND THE
DEVELOPMENT OF AN INTEGRAL PARAMETRIC AMPLIFIER ANTENNA.

269 521   0403   A SUMMARY IS PRESENTED OF RESEARCH AND DEVELOPMENT
ACTIVITIES IN CONNECTION WITH THE IMPROVEMENT OF RECEPTION OF SIGNALS
FROM ORBITING SATELLITES, THE TRACKING OF SATELLITES THROUGH DOPPLER
SHIFT MEASUREMENTS, AND INVESTIGATIONS LEADING TO THE INVENTION OF AN
INTEGRATED PARAMETRIC AMPLIFIER AND DIPOLE ANTENNA. DESIGN CONDITIONS
FOR THE LATTER ARE SUMMARIZED AND THE CONSTRUCTION AND PERFORMANCE OF
TYPICAL QUARTER AND HALF DIPOLES ARE REPORTED.

269 521   0401   (*PARAMETRIC AMPLIFIERS, *ANTENNA AMPLIFIERS, *DIPOLE A
NTENNAS, RADIO RECEIVERS, RADIO SIGNALS, RADIO RECEPTION, VERY HIGH FREQ
UENCY, DESIGN.) (*SATELLITE VEHICLES, DOPPLER TRACKING, TRACKING.) ANT
ENNAS.   -

269 530   0404   LABORATORY DESIGN FOR STUDY OF INFECTIOUS DISEASE,

269 530   0404   SOME FUNDAMENTAL CRITERIA AND TYPICAL LAYOUT
SKETCHES ARE PRESENTED TO ASSIST THOSE INTERESTED IN DESIGNING NEW
INFECTIOUS-DISEASE LABORATORIES OR IN THE CONVERSION OF EXISTING
FACILITIES. TYPICAL SAFETY EQUIPMENT DESIRABLE IN THESE LABORATORIES
IS DESCRIBED. THE BASIC CONCEPTS PRESENTED, AND THE EQUIPMENT
RECOMMENDED, HAVE BEEN PROVED IN ACTUAL PRACTICE AND FOUND TO BE OF
VALUE IN PREVENTING LABORATORY INFECTIONS.

269 530   0402   (*BIOLOGICAL LABORATORIES, *TEST FACILITIES, *SAFETY, S
AFETY DEVICES, COUNTERMEASURES, INFECTIONS, DISEASES, FUNGI, BACTERIA, V
IRUSES.)   -
269 535   0405   A TENSILE TESTING APPARATUS FOR SHORT FINE FILAMENTS
WITH OPTICAL-MECHANICAL STRAIN MEASUREMENT.

269 535   0405   AN APPARATUS WAS DESIGNED AND BUILT, WHICH WILL
OBTAIN RELATIVELY ACCURATE STRESS-STRAIN CURVES OF FINE METALLIC
FILAMENTS AND WHISKERS. THE PRINCIPLE OF OPERATION IS BASED UPON
EXTENSION OF A CALIBRATED SPRING TO APPLY THE LOAD. THE STRAIN IS
MEASURED OPTICALLY BY PROJECTING THE GAUGE MARKS ON TWO GROUND-GLASS
PLATES ATTACHED TO DIAL INDICATORS. THE MAGNITUDE OF ERROR IN LOAD AND
STRAIN MEASUREMENTS IS VERY SLIGHT. STRESS-STRAIN MEASUREMENTS OF
ELASTIC MODULI FOR TWO FILAMENT METALS WERE MADE AS A FINAL CHECK.

269 535   0403   (*TEST EQUIPMENT, DESIGN, *TENSILE PROPERTIES, METALS,
IRON, MAGNESIUM, FILAMENTS, *OPTICS, *MECHANICAL PROPERTIES, STRESSES.)
 (ELASTICITY, CALIBRATION, MEASURE-MENT, TESTS, ERRORS.)   -
269 538   0406   NO TITLE AVAILABLE

269 538   0406   A SURVEY OF LITERATURE PERTINENT TO ANALYSIS AND
BEHAVIOR OF STRUCTURAL LAMINATES IS PRESENTED. THE DISCUSSION IS
SEPARATED INTO FOUR SECTIONS (1) MECHANICAL PROPERTIES, (2)
FORMULATION OF THE GOVERNING EQUATIONS, (3) SOLUTION TECHNIQUES, AND
(4) FAILURE CRITERIA. IN EACH SECTION A SHORT RESUME IS GIVEN, IN
WHICH THE PRESENT STATE OF KNOWLEDGE IS BRIEFLY SUMMARIZED. REFERENCES
ARE GIVEN TO ABSTRACTS WHICH APPEAR AT THE END OF THE REPORT.

269 538   0404   (*LAMINATES, *STRUCTURES, *BIB-LIOGRAPHY.) (STATICS, L
OADING, MECHANICAL PROPERTIES, STRESSES, EQUATIONS, STRUCTURAL SHELLS, E
LASTICITY, DIFFERENTIAL EQUATIONS, FAILURE (MECHANICS).)   -
269 540   0407   NON-GEOSTROPHIC THEORY OF ATMOSPHERIC WAVES.

269 540   0407   THE SYMMETRIC WAVE THEORY IS APPLIED TO A
TWOISENTROPIC-LAYER MODEL OF THE ATMOSPHERE. THE NON-ROTATING
TWO-LAYER MODEL IS USED TO EXAMINE THE JUSTIFICATION FOR THE
QUASI-SOLENOIDAL APPROXIMATION AND THE VERTICAL QUASI-SYMMETRY
APPROXIMATION WHICH IS INTRODUCED IN THE SUBSEQUENT THEORY. THE
NON-GEOSTROPHIC THEORY IS DISCUSSED FOR SYMMETRIC WAVES IN AN
ATMOSPHERE WITH CONSTANT ROTATION (ZERO PLANETARY VORTICITY GRADIENT).
THE PHYSICAL INTERPRETATION OF THE BEHAVIOR OF THE WAVES IS
EMPHASIZED.

269 540   0405   (*ATMOSPHERE MODELS, WAVE TRANSMISSION, *HARMONIC ANALY
SIS, MATHE-MATICAL ANALYSIS.) (ATMOSPHERE, *CYCLONES, *DYNAMICS.)   -

269 544   0408   STRATOSPHERIC TEMPERATURES RELATED WITH SOLAR
ACTIVITY.

269 544   0408   A STUDY IS REPORTED OF THE RELATIONSHIP BETWEEN
STRATOSPHERIC TEMPERATURES AND VARIATIONS IN SOLAR ACTIVITY. MONTHLY
MEAN 50 MB. TEMPERATURES AND DEPARTURES FROM THE MEAN WERE DETERMINED
FOR SELECTED STATIONS AND STATISTICALLY COMPARED AGAINST SUNSPOT AND
GEOMAGNETIC DISTURBANCE DEPARTURES FROM THE MEAN. DATA WERE DIVIDED
INTO SUMMER AND WINTER PERIODS AND INTO THREE LATITUDINAL REGIONS TO
DETERMINE SEASONAL AND LATITUDINAL VARIATIONS. ONE HUNDRED, 50, AND 30
MB. TEMPERATURES AND 1000 AND 30 MB HEIGHTS OVER SAN JUAN WERE COMPARED
AGAINST THE NUMBERS OF SUNSPOTS. RESULTS INDICATE THAT STRATOSPHERIC
TEMPERATURES ARE BETTER RELATED WITH SUNSPOT NUMBERS THAN WITH
GEOMAGNETIC INDICATOR CI. RESULTS ALSO INDICATE A BETTER RELATIONSHIP
IN LOW LATITUDES, A BETTER RELATIONSHIP IN SUMMER, WITH INCREASING
HEIGHT. IT IS CONCLUDED THAT INCREASED ELECTROMAGNETIC RADIATION
ASSOCIATED WITH SUNSPOTS INCREASES STRATOSPHERIC TEMPERATURES AND HIGH
ATMOSPHERIC DENSITIES.

269 544   0406   (RADIOSONDES, METEOROLOGICAL DATA, *STRATOSPHERE, TEMPE
RATURE, TERRESTRIAL MAGNETISM, AIR MASS ANALYSIS, SOLAR ENERGY, SOLAR FL
ARES, SOLAR DISTURBANCES, SUNSPOTS, STATISTICAL ANALYSIS.) *THESES.

269 554   0409   ANTENNA AND RADOME MATERIALS AND PROPERTIES FOR SPACE
AND SATELLITE USE. AN ANNOTATED BIBLIOGRAPHY.

269 554   0409   THE SCOPE OF THE SEARCH WAS TO PROVIDE INFORMATION
ON AIRBORNE ANTENNA SYSTEMS APPLICABLE TO A SPACE ENVIRONMENT. AREAS
OF INTEREST INCLUDE ANTENNA AND RADOME DESIGN AND MATERIALS SUITABLE
FOR THEIR CONSTRUCTION, DIELECTRIC PROPERTIES OF THE MATERIALS, AND
POSSIBLE SPACE ENVIRONMENT EFFECTS ON THE VARIOUS PROPERTIES OF THE
MATERIALS.

269 554   0407   (*BIBLIOGRAPHY, *SPACE ENVIRON-MENTAL CONDITIONS, *MATE
RIALS FOR ELECTRONIC EQUIPMENT, *ANTENNAS, *RADOMES, DIELECTRIC PROPERTI
ES, MECHANICAL PROPERTIES, PHYSICAL PROPERTIES, RADIATION DAMAGE.)   -
269 558   0410   FLASHING LIGHT ENCODERS,

269 558   0410   TRANSMISSION OF DATA FROM SUB-ORBITAL VEHICLES IS
ACCOMPLISHED PRIMARILY THROUGH THE USE OF RF TELEMETRY METHODS. ONE
SUGGESTED APPROACH TO ASSURE DATA TRANSMISSION DURING A RF BLACKOUT
EMPLOYS A SUPPLEMENTARY FLASHING LIGHT TRANSMITTING SYSTEM. IN THIS
SYSTEM THE FLASHING LIGHT ENCODER HAS THE ASSIGNMENT OF TRANSFORMING
DATA INFORMATION IMPOSED ON A GROUP OF FM SUB-CARRIER CHANNELS INTO A
FORM COMPATABLE WITH A FLASHING LIGHT TRANSMITTER. THE ENCODER SAMPLES
THE FREQUENCY IN X-CHANNELS AND CONVERTS EACH FREQUENCY INTO A TIME
INTERVAL BETWEEN TWO FLASHES. THE COINCIDENCE OF THE START OF ONE
SAMPLE WITH THE TERMINATION OF THE PREVIOUS SAMPLE PROVIDES FOR MAXIMUM
EFFICIENCY IN THE UTILIZATION OF TIME AND POWER. (AUTHOR) AD-269
5589N6 (TISTA/SEB) OTS PRICE $8.60 LOCKHEED AIRCRAFT CORP., BURBANK,
CALIF. STUDY ON MINIMIZATION OF FIRE AND EXPLOSION HAZARDS IN ADVANCED
FLIGHT VEHICLES. REPT. FOR JUNE 60-AUG 61 ON DESIGN CRITERIA FOR FIRE
AND EXPLOSION HAZARDS IN ADVANCED FLIGHT VEHICLES. OCT 61,
186P. INCL. ILLUS. TABLES, 151 REFS. (REPT. NO. 15156) 9CONTRACT
33(616)7387, PROJ. 6075) 9ASD TR 61-288)UNCLASSIFIED REPORT
DESCRIPTORS (SUPERSONIC PLANES, SPACESHIPS,   SATELLITE VEHICLES,

MANNED, *AIRCRAFT FIRES, *AVIATION SAFETY, ELECTRICAL EQUIPMENT, AVIA
 TION FUELS, ROCKET FUELS, ROCKET OXIDIZERS, LIQUID ROCKET
PROPELLANTS, SOLID ROCKET PRO PELLANTS, MATERIALS, HAZARDS, FIRES,
EXPLO SIONS, SPARK IGNITION, RELIABILITY, SAFETY, PHYSIOLOGY.)
(FIRE EXTINGUISHERS, FIRE DETECTORS.) A STUDY IS PRESENTED OF
POTENTIAL FIRE AND EXPLOSION HAZARDS IN ADVANCED FLIGHT VEHICLES AND
.DESIGN CRITERIA FOR ENHANCEMENT OF SAFETY AND RELIABILITY OF THE
VEHICLES. THE VEHICLES COVER THE RANGE BETWEEN MACH 3 AIRPLANES AND
LONG TIME, LONG RANGE SPACE VEHICLES, HOWEVER THE DESIGN CRITERIA MAY
BE APPLIED TO ALL FLIGHT VEHICLES AS THEY ARE CURRENTLY KNOWN TO BE
CONCEIVED OR BUILT.

269 558   0408   (LIGHT COMMUNICATION SYSTEMS, DATA TRANSMISSION SYSTEMS
, PULSE COMMUNICA-TION SYSTEMS, *LIGHT PULSES, CODING, FLASH LAMPS, PULS
E GENERATORS, OSCILLATORS, DESIGN.) (*RE-ENTRY VEHICLES, TELEMETERING DA
TA, COD-ING, ELECTRONIC CIRCUITS.)   —
269 560   0411   FIELD ASSESSMENT PROBLEMS. THE DIFFUSION OF
POLYDISPERSE PARTICULATE CLOUDS,

269 560   0411   SEPARATION OF PARTICLES RELEASED IN THE ATMOSPHERE
IS DUE TO SMALL SCALE TURBULENCE AND VARYING TERMINAL VELOCITY OF THE
PARTICLES. THE DISTRIBUTION OF PARTICLES DOWNWIND, WHICH SATISFIES THE
DIFFERENTIAL EQUATION OF TURBULENT DIFFUSION, IS OBTAINED BY NUMERICAL
INTEGRATION WHEN THE DISTRIBUTION OF TERMINAL VELOCITY IS LOGNORMAL.
THE NON-DIMENSIONAL GROUND DEPOSITION DEPENDS ONLY ON THE LOGARITHM OF
THE RATIO OF THE MEDIAN TERMINAL VELOCITY TO THE FRICTION VELOCITY, AND
ON THE COEFFICIENT OF VARIATION OF THE TERMINAL VELOCITY DISTRIBUTION.
AN ANALYTIC APPROXIMATION IS OBTAINED, WHICH IS QUITE GOOD FOR A WIDE
RANGE OF BASIC PARAMETERS. ANOTHER APPROXIMATION IS USED WHICH
NEGLECTS THE VARIATION OF TERMINAL VELOCITY. THIS PROCEDURE IS
REASONABLE FOR A MUCH SMALLER RANGE OF BASIC PARAMETERS. APPLICATION
TO A DIABATIC ATMOSPHERE IS ALSO GIVEN.

269 560   0409   (TURBULENT FLOW, *PARTICLES, ATMOSPHERE, DIFFUSION.)   (
FRICTION, *VELOCITY.) (MATHEMATICAL LOGIC, PROBABILITY.)   *MICROMETEOROL
OGY.   —
269 563   0412   COMPUTER OPTIMIZATION OF NONLINEAR CONTROL SYSTEMS BY
MEANS OF DIGITIZED MAXIMUM PRINCIPLE,

269 563   0412   A DIGITIZED VERSION OF THE MAXIMUM PRINCIPLE IS
DERIVED BY A SIMPLE AND ELEMENTARY METHOD. IN THE LIMIT OF THE
DISCRETE TIME INTERVAL APPROACHING ZERO, THE DIGITIZED MAXIMUM
PRINCIPLE IS REDUCED TO PONTRYAGIN'S MAXIMUM PRINCIPLE. THE DIGITIZED
VERSION CAN BE READILY PROGRAMMED ON A COMPUTER, AND ALL FOUR TYPES OF
OPTIMIZATION PROBLEMS (1) MINIMUM TIME, (2) MAXIMUM RANGE, (3)
MINIMUM COST BETWEEN TERMINAL POINTS, AND (4) MAXIMUM GAIN (OR MINIMUM
COST) IN A GIVEN INTERVAL, ARE SOLVABLE BY THIS METHOD. THE
COMPUTATION OF THE OPTIMUM PROCESS REQUIRES RELATIVELY LITTLE COMPUTER
MEMORY, AND IS EXACT FOR SYSTEMS DESCRIBABLE BY A SET OF DIFFERENCE
EQUATIONS. THE USE OF A COMPUTER TO IMPLEMENT THE COMPUTED OPTIMUM
PROCESS IN VARIOUS WAYS IS DISCUSSED. A MORE GENERAL CONDITION FOR
BANG-BANG CONTROL IS ALSO DERIVED.

269 563   0410   (*DIGITAL COMPUTERS, DATA PROC-ESSING SYSTEMS, *LINEAR
PROGRAMMING, NONLINEAR SYSTEMS, CALCULUS OF VARIATIONS, DIFFERENCE EQUAT
IONS.) (MEMORY DEVICES, DIFFERENTIAL EQUATIONS, COMPLEX VARIABLES, (*MA
THEMATICAL ANALYSIS, PERTURBATION THEORY, TIME, COSTS, GUIDED MISSILE TR
AJECTORIES.)   --
269 564   0413   .SYNTHESIS OF LINEAR CONTROL SYSTEMS WITH LOW
SENSITIVITY TO PLANT VARIATIONS.

269 564   0413   A STUDY OF THE DESIGN OF LINEAR CONTROL SYSTEMS
INSENSITIVE TO PLANT VARIATIONS IS PRESENTED. LINEAR FEEDBACK SYSTEMS,
CHARACTERIZED BY NO DIRECT TRANSMISSION TO THE OUTPUT AND PLANTS WHICH
HAVE ONLY A SINGLE INPUT AND A SINGLE OUTPUT, ARE CONSIDERED. IN SUCH
SYSTEMS, THE DEGREE OF INSENSITIVITY, (WITH RESPECT TO PLANT
VARIATIONS), THAT CAN BE ACHIEVED IS LIMITED BY THREE FACTORS. THESE
ARE THE NOISE GENERATED BY THE MEASURING INSTRUMENT, POSSIBILITY OF
PLANT SATURATION, AND NON-MINIMUM PHASE ZEROS OF THE PLANT. METHODS
FOR SPECIFYING A SYSTEM'S SENSITIVITY FUNCTION IN THE PRESENCE OF THESE
CONFLICTING REQUIREMENTS ARE DERIVED. THE RESULTS ARE ALSO OF VALUE IN
ESTABLISHING AND LIMITING THE FUNDAMENTAL CAPABILITY OF A
PASSIVE-ADAPTIVE CONTROL SYSTEM TO MINIMIZE THE EFFECTS OF PLANT
VARIATIONS. THIS IS OF IMPORTANCE IF THE USE OF ADAPTIVE CONTROL IS
CONTEMPLATED. SUCH CONTROL IS OFTEN DIFFICULT TO IMPLEMENT AND IS SLOW
IN ADJUSTING TO THE CHANGING ENVIRONMENT. FOR THESE REASONS IT SHOULD
NOT BE USED UNLESS A CLEAR SUPERIORITY OVER INSENSITIVE (I.E.,
PASSIVEADAPTIVE) SYSTEMS CAN BE DEMONSTRATED.

269 564   0411   (*CONTROL SYSTEMS, LINEAR SYSTEMS, SYNTHESIS, *PROCESSI
NG, SENSITIVITY, FEEDBACK, DESIGN.) (*NUMERICAL ANALYSIS, PARTIAL DIFFE
RENTIAL EQUATIONS, POLYNOMIALS, SAMPLING, PROBABILITY.) (*INSTRUMENTATI
ON, NOISE.) (THESES, *BIBLIOGRAPHY.)   --
269 565   0414   DYNAMIC PROGRAMMING AND PONTRYAGIN'S MAXIMUM
PRINCIPLE,

269 565   0414   BELLMAN'S DYNAMIC PROGRAMMING AND PONTRYAGIN'S
MAXIMUM PRINCIPLE ARE GENERALLY REGARDED AS TWO ALTERNATIVE WAYS OF
SOLVING THE PROBLEM OF OPTIMUM CONTROL OF A NONLINEAR SYSTEM. A
MULTISTAGE DECISION PROCESS IS DESCRIBED AND APPLIED TO AN OPTIMAL
TRAJECTORY. THE MAXIMUM PRINCIPLE IS DERIVED WHEN ONE TRIES TO
OVERCOME CERTAIN PRACTICAL DIFFICULTIES IN DYNAMIC PROGRAMMING.

269 565   0412   (*ALGEBRAIC TOPOLOGY, FUNCTIONAL ANALYSIS.) (*PROGRAMM
ING, DIGITAL COMPUTERS, MEMORY DEVICES, ERRORS.) (NONLINEAR SYSTEMS, CO
NTROL SYSTEMS, *GUIDED MISSILE TRAJECTORIES.) (PERTURBATION THEORY, PART
IAL DIFFERENTIAL EQUATIONS.)   --
269 566   0415   OPTIMAL CONTROL IN BOUNDED PHASE SPACE,

269 566   0415   A BOUNDED PHASE SPACE CONDITION IS DERIVED FOR A
RESTRICTED CLASS OF PROBLEMS. THE CONDITION IS PROVED TO BE A
NECESSARY CONDITION FOR OPTIMAL CONTROL IN A FIXED TIME INTERVAL WITH
FREE END POINT. IF THE SYSTEM IS LINEAR, AND THE ALLOWED REGIONS OF
PHASE VARIABLES AND CONTROLS ARE CONVEX, THE CONDITION IS BOTH
NECESSARY AND SUFFICIENT, FOR OPTIMAL CONTROL IN A FIXED TIME INTERVAL,
AS WELL AS MINIMAL TIME CONTROL BETWEEN TWO FIXED POINTS.

269 566   0413   (*CONTROL SYSTEMS, CONTROL, ALGEBRAIC TOPOLOGY, *FUNCTI
ONAL ANALYSIS, PARTIAL DIFFERENTIAL EQUATIONS, NUMERICAL ANALYSIS, INTEG
RATION.) (FLIGHT PATHS, SPACE FLIGHT, EQUATIONS OF MOTION.)   --

269 567   0416   NOISE AND RANDOM PROCESSES,

269 567   0416   THE THEORY OF NOISE AND RANDOM PROCESSES IN
ELECTRONIC DEVICES WAS DEVELOPED IN TWO STAGES. THE FIRST STAGE
SPANNING THE TWO DECADES FOLLOWING 1918 BROUGHT ABOUT THE UNDERSTANDING
OF THE NATURE AND EFFECTS OF NOISE IN VACUUM TUBES AND CIRCUITS. THE
SECOND STAGE, INITIATED BY WIENER IN THE EARLY 1940'S, ESTABLISHED THE
THEORETICAL BASIS FOR SYNTHESIZING SYSTEMS WHICH OPTIMIZED THE
TRANSMISSION AND DETECTION OF SIGNALS IN THE PRESENCE OF NOISE. WHILE
THE DETAILED DISCUSSION OF THE DETECTION OF WEAK SIGNALS IN THE
PRESENCE OF NOISE IS CONTAINED IN A SEPARATE PAPER ON INFORMATION
THEORY, THIS SUBJECT IS DISCUSSED BRIEFLY TO DEMONSTRATE THE SIMILARITY
IN THE UNDERLYING CONCEPTS OF OPTIMUM TRANSMISSION AND DETECTION. THE
LITERATURE ON THE SUBJECT OF NOISE AND RANDOM PROCESSES IS SO
EXTENSIVE AS TO MAKE COMPLETE COVERAGE IMPRACTICAL. ONLY HIGHLIGHTS
AND SIGNIFICANT STEPPING STONES IN THE DEVELOPMENT OF THE THEORY ARE
DESCRIBED.

269 567   0414   (INFORMATION THEORY, NOISE, BIBLIOGRAPHY.) (*NOISE ANA
ZERS, FEEDBACK.) (SIGNALS, *STATIC ELIMINATORS, MATHEMATICAL LOGIC.)
LYZERS, FEEDBACK.) (SIGNALS, *STATIC ELIMINATORS, MATHEMATICAL LOGIC.)

269 569   0417   DEVELOPMENT OF PYROLYTIC REFRACTORY MATERIALS FOR
SOLID-FUEL ROCKET MOTOR APPLICATIONS.

269 569   0417   INVESTIGATIONS WERE MADE OF THE PREPARATION AND
EVALUATION OF REFRACTORY METAL ALLOYS OF PYROLYTIC GRAPHITE AS A
FUNCTICN OF SOURCE GAS CONCENTRATION, FLOW RATE, AND DEPOSITION
TEMPERATURE TO OPTIMIZE THE STRUCTURAL PERFORMANCE OF THE PRODUCTS IN
HIGH-TEMPERATURE EROSIVE ENVIRONMENTS. IN EACH SYSTEM ANALOGOUS
REACTION CONDITIONS ARE FOUND TO BE OPERATIVE AND MICROSTRUCTURAL, AND
OTHER PHYSICAL ASPECTS SIMILAR TO THOSE OF PYROLYTIC GRAPHITE ARE
OBSERVED. CARBIDE FORMATION AND OTHER DISADVANTAGEOUS ASPECTS OF THE
VAPOR DEPOSITION PROCESSES ARE CONSIDERED. INITIAL STUDIES OF THE
MATERIALS IN OXIDIZING ATMOSPHERES ARE DESCRIBED.

269 569   0415   (ROCKET MOTORS, *ROCKET MOTOR NOZZLES, SOLID ROCKET PRO
PELLANTS, MATERIALS, *REFRACTORY MATERIALS.) (*GRAPHITE, ALLOYS, BORON
ALLOYS, MOLYBDENUM ALLOYS, TUNGSTEN ALLOYS, TANTALUM ALLOYS, CHROMIUM A
LLOYS, MANGANESE ALLOYS, TITANIUM ALLOYS, SILICON ALLOYS, MICROSTRUCTU
RE, PHYSICAL PROPERTIES, DENSITY.) (MANUFACTURING METHODS, VAPORIZA-TIO
N, METHANES, BENZENES, METALORGANIC COM-POUNDS, METALLIC COMPOUNDS, META
LLIC SMOKE DEPOSITS.) TEST METHODS.   —
269 586   0418   HELICOPTER ROTOR HUB VIBRATORY FORCES SYSTEMATIC
VARIATION OF FLEXIBLE ROTOR BLADE PARAMETERS.

269 586   0418   A STUDY WAS MADE OF THE EFFECT ON VIBRATORY HUB
LOADS OF SYSTEMATIC VARIATIONS IN BLADE MASS, PLANFORM, TWIST
DISTRIBUTION, FLAP AND CHORD BENDING STIFFNESS, PITCH CONTROL
STIFFNESS, PITCH AXIS — CHORDWISE CENTER OF GRAVITY AXIS AERODYNAMIC
CENTER AXIS LOCATIONS, LAG DAMPER AND LAG SPRING RATES. THE VARIATIONS
ARE MADE WITH RESPECT TO THE STANDARD BLADE OF A TYPICAL SINGLE ROTOR
HELICOPTER HAVING A GROSS WEIGHT OF 8000 LBS. THE RESULTS ARE BASED ON
AN ASSOCIATED MATRIX FLEXIBLE BLADE ANALYSIS USING CLASSICAL
LINEARIZED BLADE ELEMENT AERODYNAMIC THEORY FOR THE FIRST FOUR HARMONIC
AIRLOADINGS UNIFORM INFLOW IS ASSUMED AND THE EFFECTS OF

COMPRESSIBILITY AND STALL ARE NEGLECTED. RESULTS INDICATE THAT THERE
ARE SOME PARAMETER SELECTIONS WHICH REDUCE BOTH VERTICAL AND HORIZONTAL
LOADS, OTHERS WHICH REDUCE ONE AND INCREASE THE OTHER, AND SOME WHICH
INCREASE BOTH. THE RESULTS CAN THEREFORE BE USED TO SELECT OPTIMUM
PARAMETER TRENDS FOR GIVEN HELICOPTER APPLICATIONS WHEREIN LONGITUDINAL
AND VERTICAL HUB LOADS MAY BE INDUCING COMPENSATORY RESPONSE
AMPLITUDES.

269 586   0416   (*HELICOPTER ROTORS, VIBRATION, REDUCTION, MATHEMATICAL
 ANALYSIS.) (HELICOPTER BLADES, DESIGN.)   -
269 588   0419   EXTENSION OF ELECTRONIC EQUIPMENT LIFE PREDICTION
STUDY.

269 588   0419   AN INVESTIGATION IS BEING MADE TO PROVE THE
FEASIBILITY OF PROVIDING FIELD INSTRUMENTATION CAPABLE OF MEASURING THE
RATE OF DEGRADATION OF PERFORMANCE OF INDIVIDUAL PIECES OF ELECTRONIC
EQUIPMENT. THE RATE OF DEGRADATION SHALL BE MEASURED DIRECTLY ON AN
INDIVIDUAL ELECTRONIC EQUIPMENT AND EXPRESSED IN TERMS OF OPERATING
TIME REMAINING UNTIL FAILURE OCCURS.

269 588   0417   (*TEST SETS, TEST EQUIPMENT, MAINTENANCE EQUIPMENT, INS
TRUMENTATION, *RADIO EQUIPMENT, ELECTRONIC EQUIPMENT FAILURE (MECHANICS)
, LIFE EXPECTANCY, MATHE-MATICAL PREDICTION, DESIGN, FEASIBILITY STUDIE
S.)   -
269 597   0420   METEOROLOGICAL WIND-SCALES,

269 597   0420   WIND SCALES DESIGNED FOR USE IN THE ANALYSIS OF ALL
TYPES OF METEOROLOGICAL PLOTTING MAPS USED BY THE NAVAL WEATHER
SERVICE, BOTH FOR THE SURFACE AND THE UPPER AIR, ARE PRESENTED. ALSO
PRESENTED IS A DISCUSSION OF GEOSTROPHIC AND GRADIENT WINDS, AND OF
VARIOUS TYPES OF WIND SCALES. ALTHOUGH NONE OF THE WIND SCALES
DISCUSSED OR PROVIDED ARE NEW IN CONCEPT, THE
UNIVERSAL-GEOSTROPHIC-GRADIENT-SHEAR-WIND COMPUTER AND THE CONSTANT
GEOSTROPHIC ACCELERATION SCALE ARE NOT WIDELY KNOWN.

269 597   0418   (*COMPUTERS FOR *WIND FROM NOMOGRAPHS, METEOROLOGICAL C
HARTS.) (NAVAL OPERATIONS, CLIMATIC FACTORS.)   -
269 598   0421   A NUMERICAL EXPERIMENT ON MODELLING THE BEHAVIOR OF
FOG AND STRATUS.

269 598   0421   THE FEASIBILITY OF DESIGNING A DYNAMICAL MODEL FOR
FORECASTING, THE DEVELOPMENT OF FOG AND STRATUS WAS STUDIED. TO THIS
END, SEVERAL SIMPLE MODELS BASED ON NUMERICAL SOLUTIONS OF THE
DIFFUSION EQUATION WERE CONSTRUCTED AND SOLVED, AND THE RESULTING
PREDICTIONS WERE EXAMINED WITH TWO MAJOR POINTS IN MIND. THE FIRST
POINT DEALS WITH THE FEASIBILITY OF ACHIEVING ANY DEGREE OF SUCCESS
WITH THIS TYPE OF MODEL. THE SECOND POINT DEALS WITH THE TYPE OF
OBSERVATIONAL DATA WHICH WOULD BE NEEDED FOR IT, AND THE TIME AND SPACE
SCALES ON WHICH THE OBSERVATIONS WOULD HAVE TO BE MADE.

269 598   0419   (*FOG, *STRATUS CLOUDS, WEATHER FORECASTING, *ATMOSPHER
E MODELS.) (AIR, TEM-PERATURE, WATER VAPOR, WATER, MATHEMATICAL ANALYSI
S.)   -
269 602   0422   ELECTROLUMINESCENT FERROELECTRIC(ELF) SOLID STATE
DISPLAY.
        NO ABSTRACT AVAILABLE

269 602   0420   (*DISPLAY SYSTEMS, SOLID STATE PHYSICS, LUMINESCENCE, *
LUMINESCENT MATE-RIALS.)   (FILMS, *ELECTRONIC SWITCHES, CADMIUM COMPOUND
S, SULFIDES.)   (IONIC CURRENT, ELEC-TRONIC SWITCHES, SILICONES.)   FERROE
LECTRIC MATERIALS.   —   _____
269 604   0423   REMARKS ON THE CONTINUED FRACTION CALCULATION OF
EIGENVALUES AND EIGENVECTORS,

269 604   0423   FOR EIGENVALUE PROBLEMS IN WHICH THE SECULAR
DETERMINANT HAS TRIDIAGONAL FORM, E.G., THE RIGID ASYMMETRIC ROTOR THE
SECULAR EQUATION MAY BE WRITTEN IN THE FORM F(L') EQUALS 0, WHERE F(L')
IS A CONTINUED FRACTION AND (L') AN EIGENVALUE.   FURTHERMORE, IF THE
SECULAR PROBLEM IS OF NTH ORDER, THEN THE CONTINUED FRACTION (L') MAY
BE DEVELOPED IN N DIFFERENT WAYS.   SINCE THE EIGENVALUES ARE ROOTS OF A
FUNCTION F(L'), IT IS CONVENIENT TO FIND THE EIGENVALUES BY MEANS OF
THE NEWTON-RAPHSON ITERATIVE PROCEDURE. THIS REQUIRES THAT THE
DERIVATIVE OF F(L') WITH RESPECT TO L(F'(L) BE DETERMINED.   AN EXACT
EXPRESSION FOR F'(L) IS DERIVED AND IT IS SHOWN THAT F'(L') IS IN FACT
THE NORM OF THE EIGENVECTOR BELONGING TO THE EIGENVALUE L'.   A SIMPLE
RECURSION FORMULA, IN CONTINUED FRACTION FORM, FOR THE EIGENVECTOR
ELEMENTS IS ALSO DERIVED.

269 604   0421   (*CONTINUED FRACTIONS, METAMATHEMATICS, *INTEGRAL EQUA
TIONS, *MATRIX ALGEBRA, TRANSFORMATIONS (MATHEMATICS), ELECTRONIC EQUIPM
ENT, DIGITAL COMPUTERS.)   —   _____
269 607   0424   DEVELOPMENT OF TANTALUM-TUNGSTEN ALLOYS FOR HIGH
PERFORMANCE PROPULSION SYSTEM COMPONENTS.

269 607   0424   NINE MATERIAL EVALUATION ROCKET MOTOR (MERM) NOZZLES
OF CARBURIZED TA AND HIGH W CONTENT TA BASE ALLOYS WERE DELIVERED TO
AEROJET GENERAL-SACRAMENTO FOR TESTING UNDER A-3 CONDITIONS.   THE
CARBURIZED INSERTS WERE FIRED THE CARBURIZED PURE TA FAILED, BUT THE
CARBURIZED TA 10$ W FIRINGS WERE SUCCESSFUL.   THE UNCARBURIZED HIGH W
CONTENT NOZZLES WERE RETURNED FOR CARBURIZING.

269 607   0422   (*ROCKET MOTOR NOZZLES, *TANTA-LUM ALLOYS, *TUNGSTEN AL
LOYS, TANTALUM COM-POUNDS, CARBIDES, REFRACTORY MATERIALS, HEAT RESISTAN
T ALLOYS, REFRACTORY COATINGS, EX-HAUST GASES, EROSION, EXHAUST NOZZLES,
 CON-TROL SURFACES.)   (*MANUFACTURING METHODS, CASTING, MACHINING, SHEET
S, RODS, WIRE, FORG-ING, EXTRUSION, CARBONIZATION, HEAT TREATMENT, PHYSI
CAL PROPERTIES, MECHANICAL PROPERTIES.)   —   _____
269 613   0425   THEORY OF RANDOM FUNCTIONS AND ITS APPLICATION

269 613   0425

269 613   0423   (*CONTROL SYSTEMS, SYNTHESIS, STATISTICAL FUNCTIONS, AU
TOMATIC, FUNCTIONS.) USSR.   —   _____
269 615   0426   FUNDAMENTAL PROBLEMS OF CHEMICAL KINETICS

269 615   0426   THIS PAPER DEALS WITH THE PROBLEMS AND PROPERTIES OF
FREE RADICALS.   THE PROBLEMS OF FREE RADICALS IN ANISOTROPIC STRUCTURES
ARE DISCUSSED RELATIVE TO THE FOLLOWING THERMOCHEMICAL PROPERTIES, THE
METHODS OF ELECTRON AND ION SHOCK, REACTION KINETICS, DISSOCIATION
ENERGIES, HEAT CONTENT, AND PARAMAGNETIC RESONANCE.

269 615   0424   (*REACTION KINETICS, *FREE RADI-CALS, IONS, ELECTRONS,
CHEMICAL BONDS, DIS-SOCIATION, RECOMBINATION REACTIONS, CHEMICAL REACTIO
NS, THERMOCHEMISTRY, THERMODYNAMICS, PARAMAGNETIC RESONANCE, THEORY.) (
ORGANIC COMPOUNDS, HALOCARBONS, POLYMERS, ETHYLENES, CRYSTALS, PHENYL RA
DICALS, ACETYLENES, RIBOSE, NUCLEIC ACIDS.) USSR.   -
269 616   0427   FLUX EQUIPMENT FOR AUTOMATIC AND SEMIAUTOMATIC

       NO ABSTRACT AVAILABLE

269 616   0425   (*WELDING FLUXES, *INDUSTRIAL EQUIPMENT FOR AUTOMATIC,
*WELDING, PREPARA-TION, PROCESSING, PHYSICAL PROPERTIES, ME-CHANICAL PRO
PERTIES, TEST METHODS, SPECIFICA-TIONS, MATHEMATICAL ANALYSIS, MANUFACTU
RING METHODS.) (TRANSPORTATION, CONVEYORS, HY-DRAULIC PRESSURES, THEORY
.) *USSR.   -
269 620   0428   THE THEORY OF A DOUBLE GYRO-PENDULUM,

269 620   0428   THE MOTION OF THE AXES OF SYMMETRY OF THE DOUBLE
GYRO-PENDULUM IS INVESTIGATED. THE PERIODS OF THESE MOTIONS ARE
.COMPUTED AND RESONANCE CONDITIONS ARE ESTABLISHED.

269 620   0426   (*GYROSCOPES, DIFFERENTIAL EQUATIONS, RESONANCE.)   (TRA
NSLATIONS, USSR.) (MECHANICS, DYNAMICS, *MOTION, THEORY.)   -
269 621   0429   INVESTIGATIONS OF INHOMOGENEITIES IN THE

269 621   0429   NINE ARTICLES DEVOTED TO THE STUDY OF THE PROPERTIES
OF INHOMOGENEITIES IN THE IONOSPHERE RANGING IN DIMENSIONS FROM TENS OF
METERS TO HUNDREDS OF KILOMETERS ARE PRESENTED. THE DEVELOPMENT OF THE
THREE-POINT CORRELATION ANALYSIS METHOD IS DISCUSSED, WHEREBY
TWO-DIMENSIONAL ANALYSIS IS DEVELOPED FOR A CASE OF THREE
MEASUREMENTS. A METHOD IS DESCRIBED AND RESULTS ARE GIVEN OF
INVESTIGATIONS FROM 1957-1959 ON THE PROPERTIES OF LARGE IONOSPHERIC
INHOMOGENEITIES WITHIN THE SPACE OF THREE MEASUREMENTS BY COMBINING
SPACEDIVERSITY AND FREQUENCY-SEPARATION RECEPTION. THE PROPERTIES OF
SMALL INHOMOGENEITIES ARE INVESTIGATED USING THE CORRELATION METHOD,
AND THE RESULTS OBTAINED BY THE METHOD OF SIMILARITY AND BY THE
CORRELATION METHOD ARE COMPARED. THE MOVEMENT OF DISTURBANCES
EMBRACING EXTENSIVE AREA OF THE IONOSPHERE IS GIVEN. THE POLARIZATION
OF RADIO WAVES AND ITS INFLUENCE ON THE METHODS OF OBSERVING
IONOSPHERIC INHOMOGENEITIES IS INVESTIGATED. THE USE OF THE
CORRELATION METHOD IS CONSIDERED IN THE STUDY OF THE PROPERTIES OF
IONOSPHERIC INHOMOGENEITIES. THE RESULTS OF THE INVESTIGATIONS OF
IONOSPHERIC DRIFTS FOR NEW POINTS (LRKUTSK, ROSTOV), AT WHICH
CONSIDERABLE MATERIAL WAS COLLECTED DURING THE IGY ARE GIVEN.

269 621   0427   (*RADIO WAVES, PROPAGATION, *IONOSPHERE.) (*IONOSPHERE
 MODELS, *CORRELA-TION TECHNIQUES, STATISTICAL ANALYSIS, *STA-TISTICAL F
UNCTIONS, IONOSPHERIC DISTURBANCES.) USSR.   -
269 624   0430   CHEMICAL REACTIONS ON THE SURFACE OF GERMANIUM,
SILICON, AND THEIR ELECTRONIC ANALOGUES,

       NO ABSTRACT AVAILABLE

269 624   0428   (*SEMICONDUCTORS, *SEMICONDUCTING FILMS, CATALYSTS, *GE
RMANIUM, *SILICON, INTER-METALLIC COMPOUNDS, METALLIC COMPOUNDS, ZINC CO
MPOUNDS, NICKEL COMPOUNDS, OXIDES, SURFACES, CHEMICAL REACTIONS, CATALYS
IS, REACTION KINET-ICS, ADSORPTION, IMPURITIES, DECOMPOSITION, *SURFACE
PROPERTIES, THEORY.) *BIBLIOGRAPHY, USSR, ELECTRONIC EQUIPMENT.   -

269 629   0431   ELECTRON-BEAM GUNS FOR WELDING OF METALS IN VACUUM,

269 629   0431   TWO TYPES OF INDUSTRIAL TWO-STAGE GUNS WERE
DEVELOPED WHICH PROVIDE ELECTRON BEAMS WITH DIAMETER OF 0.8-1.5 MM AT
GUN POWER OF UP TO 1.5 KW AND ACCELERATING VOLTAGE OF 22-25 KV.
METHODS WERE DEVELOPED FOR DETERMINING THE PRINCIPAL CHARACTERISTICS OF
ELECTRON GUNS (CONDUCTANCE OF SYSTEM, FOCAL LENGTH, BEAM
DIAMETER). HIGH-VOLTAGE POWER SUPPLIES WITH OUTPUT OF 3-5 KW WERE
DEVELOPED FOR THE ELECTRON GUNS. ELECTRON BEAM PRESSURE AT THE MELTING
PUDDLE POOL WAS CALCULATED.

269 629   0429   (METALS, VACUUM APPARATUS, *WELDING, *ELECTRON GUNS, EL
ECTRON BEAMS, FOCUSING, CONTROL, OPERATION, ELECTRONS, DENSITY, POWER SU
PPLIES.) (PROCESSING, *MANUFACTURING METHODS.)   USSR.   –
269 631   0432   THE LAMINAR BOUNDARY LAYER OF A FLAT PLATE IN THE
PRESENCE OF DISSOCIATION,

269 631   0432   SECOND APPROXIMATIONS OF THE SOLUTIONS OF LAMINAR
BOUNDARY-LAYER EQUATIONS ARE DERIVED FOR A HEATINSULATED FLAT PLATE AND
A FLAT PLATE WITH A GIVEN WALL TEMPERATURE. A NUMERICAL CALCULATION OF
THE HEAT-INSULATED FLAT PLATE FOR M NUMBERS OF 10, 20, AND 30 IS ALSO
GIVEN AS AN EXAMPLE   M IS THE MACH NUMBER ON THE OUTER BOUNDARY OF THE
BOUNDARY LAYER.

269 631   0430   (SHEETS, *LAMINAR BOUNDARY LAYER, DISSOCIATION, MATHEMA
TICAL ANALYSIS, DIFFEREN-TIAL EQUATIONS.) (*SUPERAERODYNAMICS, VELOC-IT
Y, ENTHALPY.) (FLUID MECHANICS, CONTINUUM MECHANICS, USSR.)   –
269 633   0433   TEMPERATURE REGULATOR OF A GYROSCOPIC INSTRUMENT

269 633   0433   THE ACCURACY OF ANY KIND OF GYROSCOPIC INSTRUMENT
DEPENDS TO A LARGE EXTENT UPON THE STABILITY OF ITS TEMPERATURE.
MAINTAINING A CONSTANT TEMPERATURE WITH AN ACCURACY OF UP TO 0.1 C AND
OVER IS POSSIBLE BY PLACING THE INSTRUMENT IN A THERMOSTAT OR BY
EMPLOYING AUTOMATIC TEMPERATURE CONTROL.

269 633   0431   (*GYROSCOPES, TEMPERATURE SENSI-TIVE ELEMENTS, *TEMPERA
TURE CONTROL, *THERMO-STATS, ELECTRONIC CIRCUITS, STABILITY, DESIGN, USS
R.)   –
269 634   0434   A STUDY OF THE TIME RESOLUTION OF PHOTOMULTIPLIERS ·
USING THE OSCILLOGRAPHIC METHOD,

269 634   0434   A DESCRIPTION IS GIVEN FOR MEASURING THE TIME
RESOLUTION OF PHOTOMULTIPLIERS USING A HIGH SPEED OSCILLOGRAPH AND
PERIODIC LIGHT FLASHES OF NANOSECOND DURATION. THE RESULTS OF
MEASURING THE TIME PARAMETERS OF THE GROUP OF PHOTOMULTIPLIERS ARE
GIVEN.

269 634   0432   (*PHOTOMULTIPLIERS, *TIME, MEASUREMENT, *OSCILLOGRAPHS,
 CIRCUITS.) (ANODES, CATHODES, LIGHT PULSES, PHOTOELECTRONS, ELECTRIC DI
SCHARGE, SPARKS.) USSR.   –
269 635   0435   INTERFERENCE LIGHT FILTERS FOR THE ULTRAVIOLET REGION
OF THE SPECTRUM,

269 635   0435   A METHOD FOR PRODUCING DIELECTRIC INTERFERENCE LIGHT
FILTERS FOR THE UV REGION OF THE SPECTRUM AND THE FEATURES OF THE
APPARATUS DEVELOPED FOR THIS PURPOSE ARE DISCUSSED. THIS NEW METHOD
WAS USED TO PRODUCE NARROW-BAND DIELECTRIC LIGHT FILTERS OF A SPECIFIC
WAVELENGTH, WITH SURFACE UNIFORMITY FOR THE 3000-4000 ANGSTROMS
REGION. THE RESULTS CAN BE USED TO SET UP LARGE-SCALE PRODUCTION OF
LIGHT FILTERS FOR THE UV REGION AT PLANT LABORATORIES.

269 635   0433   (*OPTICAL FILTERS, *ULTRAVIOLET FILTERS, OPTICAL COATIN
GS, OPTICAL MATERIALS, MATERIALS, FILMS, *DIELECTRIC FILMS, DIELEC-TRICS
, MAGNESIUM COMPOUNDS, FLUORIDES, LEAD COMPOUNDS, CHLORIDES, MANUFACTURI
NG METHODS, THICKNESS, CONTROL, LIGHT TRANSMISSION.) USSR, LABORATORY EQ
UIPMENT, VACUUM OPERATIONS.   -
269 636   0436   TRANSMITTANCE OF THIN ATMOSPHERIC LAYERS IN THE 1-13
MICRON RANGE,

269 636   0436   THE PROBLEM OF THE APPLICABILITY OF THE EXPONENTIAL
LAW AND THE SQUARE-ROOT LAW TO DESCRIBE THE ATTENUATION OF INFRARED
RADIATION IS CONSIDERED FOR LAYERS OF WATER (1/10,000) TO (1/100) CM
THICK. QUANTITATIVE DATA ARE OBTAINED FOR THE SPECTRAL AND INTEGRAL
TRANSMITTANCE OF THIN ATMOSPHERIC LAYERS (UP TO 3 M) IN THE 1-13
MICRON RANGE.

269 636   0434   (*INFRARED RADIATION, ATTENUA-TION, *ATMOSPHERE, MATHEM
ATICAL ANALYSIS, NUMERICAL ANALYSIS, FUNCTIONS.) (*INFRARED RADIATION,
ABSORPTION, *WATER VAPOR, SPECTRO-GRAPHIC ANALYSIS, SPECTROGRAPHIC DATA.
) USSR.   -
269 641   0437   THE ALMOST-PERIODIC REGIME OF A FOUR-DIMENSIONAL
AUTOMATIC CONTROL SYSTEM,

        NO ABSTRACT AVAILABLE

269 641   0435   (*CONTROL SYSTEMS, AUTOMATIC, SYNTHESIS, DIFFERENTIAL E
QUATIONS, TOPLOGY.) (*ROCKET TRAJECTORIES, MATRIX ALGEBRA, IN-EQUALITIES
, MATHEMATICAL ANALYSIS.) USSR.   -
9 645   0436   (SPACESHIPS, *SPACE FLIGHT, SPACE PROBES, BOOSTER ROCKE
269 645   0438   INTERPLANETARY ROUTES,

269 645   0438   SPACEFLIGHT IS DISCUSSED IN TERMS OF ROCKET
BOOSTERS, LAUNCHING VELOCITY, FLIGHT DURATION, FLIGHT TRAJECTORIES,
OPTIMUM LAUNCHING TIME, AND LAUNCHING DELAYS AND ERRORS.

269 645   0436   (SPACESHIPS, *SPACE FLIGHT, SPACE PROBES, BOOSTER ROCKE
TS, LAUNCHING, SPACE NAVIGATION, FLIGHT PATHS, NAVIGATION, VELOCITY, THE
ORY, ANALYSIS.) USSR.   -
269 653   0439   THE PROTECTION OF CARBON AND GRAPHITE AGAINST
OXIDATION AT TEMPERATURES OF 1200 DEGREES,

269 653   0439   HIGH-QUALITY GLASSY SILICIDIC COATINGS TO PROTECT
VARIOUS TYPES OF CARBON-GRAPHITE MATERIALS FROM OXIDATION AT 1200 C FOR
MORE THAN 100 HR WERE DEVELOPED. THE COMPOSITION OF THE BONDING AGENTS
GREATLY INFLUENCED THE PROPERTIES OF THE COATINGS. THESE PROPERTIES
WERE CONTROLLED BY CHANGING THE COMPOSITION OF THE BONDING AGENTS.
WHEN STUDYING WETTABILITY, DATA OBTAINED BY THE DROP-SPREAD METHOD DID
NOT SOLVE THE PROBLEM OF THE SUITABILITY OF A BONDING AGENT FOR
HETEROGENEOUS COATINGS. THE METHOD OF THE PRELIMINARY APPLICATION OF

POWDERED-GLASS DROSS TO THE SURFACE OF THE SAMPLES MADE IT POSSIBLE TO DERIVE MORE CORRECT CONCLUSIONS ON THE APPLICABILITY OF GLASS AS A BONDING AGENT FOR COATINGS.

269 653   0437   (*ANTIOXIDANTS, *CERAMIC COAT-INGS, *OXIDATION INHIBITO RS, *REFRACTORY COATINGS FOR *GRAPHITE, *CARBON.) (COATINGS, TITANIUM COMPOUNDS, SILICIDES, MOLYBDENUM COM-POUNDS.) (SILICON COMPOUNDS, NITRI DES, OXIDES, CARBIDES.) (TESTS, TEST METHODS, HIGH TEMPERATURE RESEARCH , USSR.) (REFRACTORY MATERIALS, WETTING AGENTS, BONDING.)   -
269 654   0440   MAGNETISM AND LIFE,

269 654   0440   NO ABSTRACT AVAILABLE

269 654   0438   *MAGNETIC FIELDS, MAGNETISM, BIOPHYSICS, PLANTS, ANIMAL S, GROWTH, USSR.   -
269 655   0441   SHIELDING A GRYOSTABILIZER WHICH IS A SOURCE OF ELECTROMAGNETIC INTERFERENCE,

269 655   0441   NO ABSTRACT AVAILABLE

269 655   0439   (*SHIELDING OF *GYRO STABILIZERS.) (SHIELDING AGAINST ELECTRO-MAGNETIC WAVES, *INTERFERENCE FROM GYRO STABILIZERS.) USSR. -

269 656   0442   RECOGNITION OF AIRCRAFT, GLIDERS, AND HELICOPTERS

269 656   0442   NO ABSTRACT AVAILABLE

269 656   0440   (*JET FIGHTERS, IDENTIFICATION, AERODYNAMIC CONFIGURATI ONS, FLIGHT SPEEDS, ARMAMENT, DESIGN, USSR, POLAND.)   -
269 658   0443   PYROLYTIC CARBIDE DEVELOPMENT PROGRAM.

269 658   0443   REFRACTORY PYROLYTIC CARBIDES WERE INVESTIGATED AS EROSION RESISTANT BARRIERS ON THE SURFACE OF ROCKET NOZZLES, SPECIFICALLY FOR POLARIS NOZZLES WITH ADVANCED PROPELLANTS. A MIXTURE OF REACTANT GASES COMPOSED OF A METAL HALIDE AND A HYDROCARBON WAS DEVELOPED FOR COATINGS OF TAC, HFC AND NBC ON GRAPHITE SUBSTRATES. HIGH DENSITY, SINGLE PHASE, IMPERVIOUS CARBIDE COATINGS WERE PRODUCED WHICH ARE INTIMATELY BONDED TO THEIR SUBSTRATE. SPECIAL GRAPHITES ARE REQUIRED WITH COEFFICIENTS OF THERMAL EXPANSION COMPATIBLE WITH THE CARBIDES. PYROLYTIC TACAND NBC-COATED ROCKET NOZZLE INSERTS RESISTED EROSION. PARTIAL FAILURES, IN TERM OF REMOVAL OF THE COATINGS IN THE EXIT CONE SECTION OF THE NOZZLES, APPEARED TO BE CAUSED BY THERMAL STRESSES OR FROM STRUCTURAL CHANGES IN THE SUBSTRATE MATERIAL. THERMAL SHOCK DOES NOT APPEAR TO BE A PROBLEM WHEN THESE COATINGS ARE EMPLOYED. THE FEASIBILITY OF PRODUCING FULL SCALE ROCKET NOZZLES WITH SURFACE COATINGS OF PYROLYTIC CARBIDES WAS ALSO DEMONSTRATED.

269 658   0441   (*ROCKET MOTOR NOZZLES, REFRAC-TORY COATINGS OF *CARBID ES FROM PYROLYSIS OF HYDROCARBONS AND TANTALUM COMPOUNDS, HAFNIUM COMPO UNDS, NIOBIUM COMPOUNDS, CHLORIDES ON GRAPHITE, STRUCTURES, NOZZLES.) (TESTS, FAILURE (MECHANICS), THERMAL EXPANSION, THERMAL STRESSES.) (ERO SION, INHIBITION.)   -

269 660   0444   ELECTRONIC TUBE TECHNOLOGY-MICROWAVE TUBES.

269 660   0444   RESEARCH WAS CONTINUED ON THE USE OF FAST CYCLOTRON WAVES TO PRODUCE FREQUENCY MULTIPLICATION IN AN OUTPUT COUPLER. AN ATTEMPT WAS MADE TO IMPROVE THE PERFORMANCE OF THE MULTIPLIER BY INCREASING THE PERVEANCE OF THE ELECTRON BEAM. THE HEIL ELECTRON GUN HAS SHOWN GOOD CHARACTERISTICS IN HIGH PERVEANCE OPERATION, SO A STANDARD HEIL GUN WITH A .010 IN. ANODE APERTURE WAS PLACED IN A MAGNETIC SHIELD. THE PERFORMANCE OF THIS GUN WAS ENCOURAGING, AS A BEAM CURRENT OF 7.5 MILLIAMPERES WAS OBTAINED AT 350 VOLTS. THIS IS AN INCREASE OF 2.8 TIMES IN BEAM CONDUCTANCE, WHICH SHOULD INCREASE THE OUTPUT POWER BY THE SAME FACTOR, AND THE OVERALL CONVERSION EFFICIENCY SHOULD INCREASE APPROXIMATELY BY A FACTOR OF 8.

269 660   0442   (*FREQUENCY MULTIPLIERS, *ELEC-TRON TUBES, MICROWAVE EQ UIPMENT, ELECTRON BEAMS, ELECTRON GUNS, WAVEGUIDES, MICROWAVES, RADIOFRE QUENCY GENERATORS, DESIGN, TESTS.)   -
269 670   0445   GENERAL ON-THE-JOB CRITERIA OF AIRMAN EFFECTIVENESS APPLIED TO THREE CAREER FIELDS,

269 670   0445   THREE CRITERION MEASURES WERE CONSTRUCTED AND ADMINISTERED AT TWO AIR FORCE BASES TO AIRMEN SELECTED FROM THREE CAREER AREAS WHICH CORRESPOND TO THREE APTITUDE GROUPS DEFINED BY AIR FORCE CLASSIFICATION TESTS. EACH OF THE THREE INSTRUMENTS WAS SUBJECTED TO A FACTOR ANALYSIS THE RESULTING FACTOR SCORES, IN COMBINATION WITH TEST SCORES AND OPERATIONALLY DERIVED PERFORMANCE RATINGS, WERE ALSO FACTOR ANALYZED. SIX FACTORS WERE IDENTIFIED, WITH EACH FACTOR DEFINED BY AT LEAST TWO OF THE MAJOR VARIABLES. SHORT FORMS OF TWO OF THE CRITERION INSTRUMENTS WERE PREPARED FOR FURTHER USE. THE RESULTS SUGGEST SUITABILITY OF THESE SCALES ACROSS THE THREE JOB AREAS.

269 670   0443   (*JOB ANALYSIS, STANDARDS, AVIATION PERSONNEL, EFFECTIV ENESS.) *FACTOR ANALYSIS.   -
269 671   0446   DEVELOPMENT OF RIGID PAVEMENT THICKNESS REQUIREMENTS FOR MILITARY ROADS AND STREETS,

269 671   0446   A NEW PROCEDURE WAS DEVELOPED FOR THE DESIGN OF RIGID PAVEMENTS FOR ROADS AND STREETS AT MILITARY INSTALLATIONS. THE PURPOSE WAS TO PROVIDE GREATER FLEXIBILITY IN THE DESIGN PROCEDURE TO INCLUDE THE EFFECTS OF VEHICLE LOADING, VEHICLE TYPE, WHEEL CONFIGURATION, AND VOLUME OFF TRAFFIC. BY EXPRESSING ALL TYPES OF VEHICULAR TRAFFIC IN TERMS OF AN EQUIVALENT NUMBER OF APPLICATIONS OF AN 18,000 POUND LOAD ON A SINGLE AXLE EQUIPPED WITH DUAL WHEELS, THE VARIABLES IN DETERMINING THE REQUIRED PAVEMENT THICKNESS ARE PRODUCED TO THE TOTAL NUMBER OF LOAD APPLICATIONS, THE FLEXURAL STRENGTH OF THE CONCRETE, AND THE MODULUS OF SUBGRADE REACTION. DEVELOPMENT OF THE DESIGN PROCEDURE IS DESCRIBED IN DETAIL. APPLICATION OF THE METHOD TO THE DESIGN OF MILITARY ROADS AND STREETS IS ILLUSTRATED BY EXAMPLE.

269 671   0444   (*PAVEMENTS OF *ROADS IN *MILI-TARY FACILITIES.) (DESI GN OF CONCRETE, PAVEMENTS, THICKNESS, LOAD DISTRIBUTION, TRAF-FIC, EFFEC TIVENESS.)   -

269 673   0447   COMBUSTION PHENOMENA AS A FUNCTION OF PRESSURE.

269 673   0447   THE BURNING VELOCITIES OF VARIOUS FUEL-OXIDIZER
FLAMES WERE MEASURED IN THE SUB-ATMOSPHERIC AND IN THE ABOVE
ATMOSPHERIC PRESSURE REGIONS. RESULTS SHOW THE BURNING VELOCITIES OF
LOW ENERGY SYSTEMS IN GENERAL DECREASE WITH INCREASING PRESSURE WHILE
THE BURNING VELOCITIES OF HIGH ENERGY SYSTEMS INCREASE WITH INCREASING
PRESSURE. FOR INTERMEDIATE ENERGY SYSTEMS THE BURNING VELOCITIES
INITIALLY INCREASE WITH INCREASING PRESSURE AND DECREASE UPON FURTHER
INCREASE OF PRESSURE. THE EFFECT OF PRESSURE TOGETHER WITH THAT OF
ADDITIVES ON THE BURNING VELOCITIES OF SEVERAL FUEL-OXIDIZER SYSTEMS
WAS ALSO INVESTIGATED. RESULTS SHOWED THAT THE ADDITIVES USED DID NOT
CHANGE THE GENERAL PRESSURE EFFECT ON THE BURNING VELOCITIES OF THE
SYSTEMS INVESTIGATED. THE BURNING VELOCITIES OF MIXTURES CONTAINING
CARBON MONOXIDE INCREASE WHEN A HYDROCARBON ADDITIVE METHYL BROMIDE AND
ETHYL NITRATE IS USED. IN OTHER MIXTURES, THE ADDITIVE GENERALLY
REDUCED THE BURNING VELOCITIES.

269 673   0445   (*COMBUSTION, CARBON COMPOUNDS, MONOXIDES, METHANES, BR
OMIDES, CHLORIDES, FLUORIDES, HYDROGEN, AMMONIA, AIR, OXYGEN, FUEL ADDIT
IVES, PRESSURE, HIGH PRESSURE RE-SEARCH, FLAME PROPAGATION, VELOCITY, TE
STS, TABLES.)   —
269 677   0448   RESEARCH ON R.F. COAXIAL CONNECTORS, BROADBAND, HIGH
TEMPERATURE RADIATION RESISTANT.

269 677   0448   EXTENSIVE WORK ON THE DEVELOPMENT OF A SUCCESSFUL
HERMETIC SEAL USING CORNING $1723 GLASS AS THE INSULATOR FOR THE
SHELL-INSULATOR-CONTACT STRUCTURE IS REPORTED. DESIGN WORK IN THE AREA
OF THE DIFFERENT CONNECTOR TYPES WAS CONTINUED.   A SUCCESSFUL METHOD
OF MECHANICALLY ATTACHING THE CABLE TO THE CONNECTOR WAS DESIGNED AND
TESTED. A METHOD OF AFFECTING A HERMETIC SEAL AT THE INTERFACE WAS
DEVELOPED THAT WILL SUCCESSFULLY PASS THE MATING AND UNMATING
REQUIREMENTS OF THE CONTACT HOWEVER, DIFFICULTIES WERE ENCOUNTERED
WHEN THE UNIT WAS HEAT CYCLED.

269 677   0446   (*ELECTRIC CONNECTORS, *COAXIAL CABLES, BROADBAND, RADI
OFREQUENCY CABLES, HIGH TEMPERATURE RESEARCH, RADIATION EFFECTS, TEMPERA
TURE, DESIGN.) (GLASS SEALS, INSULATING MATERIALS, HEAT RESISTANT GLASS
, ELECTRICAL PROPERTIES, PHYSICAL PROPERTIES, TESTS.)   —
269 285   0449   THEORY OF IONIZED TRAILS FOR BODIES AT HYPERSONIC
SPEEDS,

269 285   0449   THE CHARACTERISTICS OF THE GASEOUS TRAIL REMAINING
BEHIND A BODY MOVING THROUGH THE ATMOSPHERE AT HYPERSONIC SPEEDS ARE
DISCUSSED. MEANS ARE SOUGHT FOR ASCERTAINING THOSE VARIABLES THAT CAN
BE MEASURED AND USED TO PREDICT THE CHARACTERISTICS OF THE BODY CAUSING
THE TRAIL. THE AVAILABLE THEORETICAL AND EXPERIMENTAL LITERATURE IS
  VI W N T   S   ASP CTS OF HYPER ONIC RAIL   ARE RE E TED. I
THE CASE OF THERMODYNAMIC EQUILIBRIUM, A UNIVERSAL SOLUTION IS FOUND
REVIEWED AND THE BASIC ASPECTS OF HYPERSONIC TRAILS ARE PRESENTED. IN
THE CASE OF THERMODYNAMIC EQUILIBRIUM, A UNIVERSAL SOLUTION IS FOUND
FOR THE VELOCITY AND ENTHALPY DISTRIBUTIONS AT A STATION BEHIND THE
BODY WHERE THE PRESSURE HAS REACHED ITS AMBIENT FREE-STREAM VALUE. THE
THERMAL-CONDUCTION PART OF THE TRAIL IS ALSO STUDIED. AN ANALYTIC
SOLUTION IS FOUND FOR THE CASE OF VARIABLE THERMAL CONDUCTIVITY. THE

LENGTH OF THE TRAIL BASED ON A MINIMUM IONIZATION LEVEL IS CALCULATED
AT DIFFERENT ALTITUDES FOR AN ILLUSTRATIVE RE-ENTRY. THE INFLUENCE OF
THE TRAILING SHOCK ON THE CONDUCTION PART OF THE TRAIL IS DISCUSSED. A
PRELIMINARY STUDY IS ALSO MADE OF THE TRAIL UNDER CHEMICALLY FROZEN
CONDITIONS.

269 285 0447 (*CONDENSATION TRAILS, BODIES OF REVOLUTION, *HYPERSONI
CS.) (AERODYNAMIC CONFIGURATIONS, THERMODYNAMICS, *GAS IONIZA-TION, VEL
OCITY, ENTHALPY.) (*RE-ENTRY AERO-DYNAMICS, HEAT TRANSFER, THERMAL COND
UCTIVITY.)   -
269 282 0450 FLIGHT SIMULATION OF ORBITAL AND REENTRY VEHICLES.
PART I - DEVELOPMENT OF EQUATIONS OF MOTION IN SIX DEGREES OF FREEDOM.

269 282 0450 EQUATIONS GOVERNING THE MOTION OF A LIFTING REENTRY
VEHICLE IN SIX DEGREES OF FREEDOM ARE DEVELOPED FOR SIMULATION
PURPOSES. EFFECTS OF EARTH ROTATION, EARTH OBLATENESS AND WIND
VELOCITY ARE INCLUDED. THE ROTATIONAL EQUATIONS ARE CONVENTIONAL
EQUATIONS INVOLVING ANGULAR RATES REFERRED TO BODY AXES. TWO DIFFERENT
FORMULATIONS OF THE TRANSLATIONAL EQUATIONS ARE PRESENTED, USING
DIFFERENT COORDINATE SYSTEMS. ONE INVOLVES SPHERICAL COORDINATES
REFERRED TO THE EQUATORIAL PLANE OF THE ROTATING EARTH THE OTHER
INVOLVES SPHERICAL COORDINATES REFERRED TO A NOMINAL TRAJECTORY PLANE
FIXED WITH RESPECT TO INERTIAL AXES. THE FORMER HAS THE ADVANTAGE THAT
EARTH ROTATION AND OBLATENESS ARE TAKEN INTO ACCOUNT MORE SIMPLY, BUT
AN INDETERMINACY IS ENCOUNTERED IN THE EVENT OF FLIGHT OVER A POLE.
THE LATTER FORMULATION ELIMINATES THIS INDETERMINACY BUT IS OTHERWISE
MORE COMPLEX. IT IS CONCLUDED THAT THE EQUATIONS DEVELOPED ARE
SUITABLE FOR DIGITAL OR HYBRID ANALOG-DIGITAL COMPUTATION, BUT THAT
ACCURACY REQUIREMENTS WOULD BE EXCESSIVE FOR ANALOG COMPUTATION
EXCLUSIVELY. AN ALTERNATIVE FORMULATION, SUITABLE FOR ANALOG
COMPUTATION, IS PRESENTED IN PART II OF THE PRESENT SERIES (AD-269
283).

269 282 0448 (*RE-ENTRY VEHICLES, *SATELLITE VEHICLES, ATMOSPHERE EN
TRY, *FLIGHT SIMULATORS, PILOTS, TRAINING DEVICES.) (SATELLITE VEHICLE
TRAJECTORIES, FLIGHT PATHS, DYNAMICS, MATHEMAT-ICAL ANALYSIS, EQUATIONS,
DIFFERENTIAL EQUA-TIONS, MATRIX ALGEBRA, DIGITAL COMPUTERS.)   -
269 284 0451 MICRO-MODULE PRODUCTION PROGRAM.

NO ABSTRACT AVAILABLE

269 284 0449 (*SUBMINIATURE ELECTRONIC EQUIP-MENT FOR *RADIO COMMUNI
CATION SYSTEMS AND DIGITAL COMPUTERS, *PACKAGING, *PACKAGED CIR-CUITS, P
ROCESSING, PRODUCTION, STANDARDS, COSTS, FEASIBILITY STUDIES, RELIABILI
TY.) (*MINIATURE ELECTRONIC EQUIPMENT, PACKAGING.)   -
269 286 0452 RESEARCH IN BIOPHYSICAL ASPECTS OF PHOTOSYNTHESIS.

269 286 0452 NO ABSTRACT AVAILABLE

269 286 0450 (*PHOTOSYNTHESIS, BIOPHYSICS, BIOCHEMISTRY, FATTY ACIDS
, ALBUMINS, THEORY.) (PLANTS, GROWTH.) ELECTRON MICROSCOPY.   -
269 280 0453 MAGNETOHYDRODYNAMIC EFFECTS ON EXOTHERMAL WAVES. I.
THEORETICAL PROBLEMS ON A MACROSCOPIC SCALE. II. EXPERIMENTAL STUDY
WITH HYDROGEN-OXYGEN DETONATION WAVES.

269 280   0453   VARIOUS PROBLEMS ASSOCIATED WITH THE MACROSCOPIC MAGNETOHYDRODYNAMIC EFFECTS ON AN EXOTHERMAL WAVE WERE TREATED ON THE BASIS OF ONE-DIMENSIONAL FLOW CONSIDERATIONS. A STEADY EXOTHERMAL WAVE TRAVELING IN AN IONIZED MEDIUM UNDER THE INFLUENCE OF A TRANSVERSE MAGNETIC FIELD WAS FOUND TO DISPLAY PROPERTIES SIMILAR TO THOSE OF A CLASSICAL DETONATION OR DEFLAGRATION WAVE. FOR A HYDROMAGNETIC EXOTHERMAL WAVE, IT WAS FOUND THAT A DISCONTINUITY EITHER IN THERMODYNAMIC QUANTITIES OR IN MAGNETIC FIELD STRENGTH APPEARS AS SOON AS THE FLOW REACHES THE TRANSITION REGION.

269 280   0451   (*MAGNETOHYDRODYNAMICS, GAS FLOW, GAS IONIZATION, CHEMI CAL REACTIONS, HEAT, FLAMES, *ELECTROMAGNETIC WAVES, HALL EFFECT, THERM ODYNAMICS, THERMAL CON-DUCTIVITY, HYDROGEN, OXYGEN, SHOCK WAVES.) (EXPER IMENTAL DATA, TABLES OF CHEMICAL PROPERTIES, PHYSICAL PROPERTIES.)   (PAR TIAL DIFFERENTIAL EQUATIONS, LINEAR SYSTEMS, PERTURBATION THEORY.)   -
269 283   0454   FLIGHT SIMULATION OF ORBITAL AND REENTRY VEHICLES. PART II - A MODIFIED FLIGHT PATH AXIS SYSTEM FOR SOLVING THE SIX-DEGREE-OF-FREEDOM FLIGHT EQUATIONS.

269 283   0454   THREE TRANSLATIONAL AND THREE ROTATIONAL EQUILIBRIUM EQUATIONS FOR AN ORBITAL VEHICLE SUBJECT TO AERODYNAMIC AND JET REACTION FORCES ARE DERIVED USING A MODIFIED FLIGHT-PATH AXIS SYSTEM FOR THE TRANSLATIONAL EQUATIONS. DEPENDENT VARIABLES OF THE SYSTEM ARE HORIZONTAL VELOCITY COMPONENT, VERTICAL VELOCITY COMPONENT, AND FLIGHT-PATH HEADING ANGLE. RESULTING EQUATIONS ARE SHOWN TO HAVE ADVANTAGES FOR COMPUTER MECHANIZATION OVER ALTERNATIVE AXIS SYSTEMS FOR THE TRANSLATIONAL EQUATIONS. COMPLETE EQUATIONS FOR DETERMINING VEHICLE ORIENTATION, INSTANTANEOUS LATITUDE AND LONGITUDE, ANGLE OF ATTACK, ANGLE OF SIDESLIP, AERODYNAMIC FORCES AND MOMENTS, ETC., ARE PRESENTED. MODIFICATIONS IN THE TRANSLATIONAL EQUATIONS WHICH ALLOW DIRECT SOLUTION BY AN ANALOG COMPUTER ARE ALSO GIVEN. ANALOG COMPUTER MECHANIZATION OF THESE EQUATIONS IN BOTH REAL AND FAST TIME IS DESCRIBED, INCLUDING A NOVEL TECHNIQUE FOR DIVISION WHICH PRESERVES FAVORABLE MULTIPLIER SCALING. SPECIFIC MACHINE RESULTS ARE PRESENTED WHICH DEMONSTRATE ACCURATE SOLUTION OF CLOSE-SATELLITE TRAJECTORIES, INCLUDING RE-ENTRY FROM SATELLITE ALTITUDES TO SEA LEVEL.

269 283   0452   (*RE-ENTRY VEHICLES, *SATELLITE VEHICLES, ATMOSPHERE EN TRY, *FLIGHT SIMULATORS, PILOTS, TRAINING DEVICES.) (SATELLITE VEHICLE TRAJECTORIES, FLIGHT PATHS, DYNAMICS, MATHE-MATICAL ANALYSIS, EQUATIONS, DIFFERENTIAL EQUATIONS, VECTOR ANALYSIS, ANALOG COMPUTERS.)   -
269 293   0455   SPEECH ANALYSIS TECHNIQUES.

269 293   0455   THE WORK ON THE 51-CHANNEL ANALYZER WAS CONTINUED. THE MECHANICAL ASSEMBLY OF THE FILTERBANK WAS STARTED. COMPARATIVE STUDIES OF VARIOUS MEANS OF SPEECH SPECTRUM ANALYSIS WERE CONCERNED WITH FORMANT FREQUENCY MEASUREMENTS FROM SONA-GRAPH SPECTROGRAMS AND SECTIONS. EVALUATIONS OF VARIOUS MEANS OF VOICE PITCH EXTRACTION WERE FOLLOWED UP BY A COMPLETE CONSTRUCTION OF A DUAL CHANNEL PITCH EXTRACTOR AND DECISION CIRCUIT. DEVELOPMENT WAS CONTINUED ON VARIOUS METHODS FOR AUTOMATIC RECOGNITION OF SPECIFIC PHONETIC FEATURES AND SOUND CATEGORIES. IT WAS DEMONSTRATED THAT THE PROBABILITY OF CORRECT IDENTIFICATION OF A CONSONANT NEXT TO A VOWEL AS A FUNCTION OF THE TIME LOCATION OF THE CUT IN TIME GENERALLY HAS A MAXIMUM IN ITS RATE OF RISE AT THE PHYSICAL BOUNDARIES.

269 293   0453   (SWEDEN, SPEECH, ANALYSIS, DATA PROCESSING SYSTEMS, SPE
CTROGRAPHIC ANALYSIS, *SPEECH TRANSMISSION.) (*VOICE COMMUNICATION SYST
EMS, *RADIO COMMUNICATION SYSTEMS, INTELLI-GIBILITY, SOUND TRANSMISSION,
 AUDIOFREQUENCY, TRACKING, BAND-PASS FILTERS, FREQUENCY ANALY-ZERS, *SPE
ECH REPRESENTATION, ACOUSTICS, LOW PASS FILTERS.)   —
269 295   0456   SURFACE CURRENT MEASUREMENTS WITH AN ELECTRIC PROBE,

269 295   0456   THE USE OF AN ELECTRIC PROBE FOR MEASUREMENT OF
INDUCED SURFACE CURRENTS ON OBSTACLES IN A PARALLEL PLATE REGION IS
DESCRIBED. AN ANALYSIS OF THE SOURCES OF ERROR, AND IN PARTICULAR THE
INTERACTION OF THE PROBE WITH THE OBSTACLE, IS EXAMINED THEORETICALLY
AND EXPERIMENTALLY. IT IS CONCLUDED THAT THE TECHNIQUE IS CAPABLE OF
YIELDING MEASUREMENTS OF GOOD ACCURACY. THE MEASURED SURFACE CURRENTS
ON FLAT AND CURVED STRIPS ARE GIVEN AS EXAMPLES.

269 295   0454   (*ELECTROMAGNETIC FIELDS, ELEC-TROMAGNETIC WAVES, DIFFR
ACTION, MAGNETIC FIELDS, SCATTERING, *ELECTROMAGNETIC WAVE REFLECTIONS,
MICROWAVES, ELECTRIC FIELDS, IMPEDANCE, MEASUREMENT.) (*MICROWAVE PROBE
S, TEST EQUIPMENT, REFLECTORS, X BAND, ERRORS, TEST METHODS.)   —
269 300   0457   SURVEY OF MICROMINIATURIZATION OF ELECTRONIC
EQUIPMENT,

269 300   0457   A SURVEY WAS MADE OF MICROMINIATURIZATION OF
ELECTRONIC EQUIPMENT. APPROXIMATELY 150 FIRMS IN THE ELECTRONIC
EQUIPMENT AND PARTS INDUSTRY WERE FOUND TO BE ENERGETICALLY ENGAGED IN
MICROMINIATURIZATION RESEARCH, DEVELOPMENT, AND TECHNICAL SUPPORT. A
WIDE VARIETY OF FABRICATION TECHNIQUES WERE USED, RANGING FROM VACUUM,
ELECTRICAL, AND CHEMICAL DEPOSITING OF THIN FILMS TO THE GROWING OF
SEMICONDUCTOR RIBBONS. AMONG METHODS USED ARE SPECTROGRAPHIC PLATES
FOR PHOTO RESISTS, SCREEN AND PHOTOLITHOGRAPHIC PRINTING,
MICROMACHINING, AIR ABRASION, ULTRASONIC MACHINING, AND ELECTRONIC
ETCHING. MICROMINIATURE CIRCUITS OF SOME TYPES ARE EXPECTED TO BE
AVAILABLE SOON FOR LIMITED APPLICATIONS. IMPROVED PERFORMANCE,
RESISTANCE TO ENVIRONMENTAL EXTREMES, AND INCREASED RELIABILITY CAN BE
ANTICIPATED. REDUCED SIZE WILL EVENTUALLY PERMIT SATELLITE PAYLOADS
WITH HIGHLY SOPHISTICATED INSTRUMENTATION AND COMPLETELY REDUNDANT
CONTROL SYSTEMS.

269 300   0455   (*SUBMINIATURE ELECTRONIC EQUIPMENT, *ELECTRONIC CIRCUI
TS, PRODUCTION, MANUFACTURING METHODS, PACKAGING, PACKAGED CIRCUITS.) (
MINIATURE ELECTRONIC EQUIPMENT, *BIBLIOGRAPHY.)   —
269 304   0458   ORBITAL CONTROL AND ANALYSIS TECHNIQUES FOR
EQUATORIAL 24-HOUR SATELLITES,

269 304   0458   METHODS TO IMPLEMENT SUCH AN ORBITAL CONTROL
FUNCTION ARE DESCRIBED. THE REPORT IS LIMITED TO THE PRESENTATION OF
BASIC CORRECTION TECHNIQUES AND ANALYTIC METHODS. EMPHASIS IS PLACED ON
MINIMIZING OR NEARLY MINIMIZING TOTAL IMPULSE REQUIREMENTS. SUITABLE
COORDINATES FOR THE PROBLEM AND, USING THE LINEARIZED EQUATIONS OF
MOTION, ARE DERIVED UNFORCED ORBITAL MOTION IN TERMS OF THE
COORDINATES. GRAPHIC PORTRAYAL OF THE MOTION IS INTRODUCED TO PRESENT
CLEARLY ALL CHARACTERISTICS OF THE MOTION. ORBIT SPECIFICATIONS ARE
INTERRELATED AND TABULATED. IMPORTANT ORBITAL PERTURBATIONS CAUSED BY
LUNAR AND SOLAR GRAVITATIONAL FIELDS AND EARTH OBLATENESS ARE GIVEN.

269 304   0456   (SATELLITE VEHICLES, SATELLITE VEHICLE TRAJECTORIES, *S
ATELLITE ALTITUDE, ORBITAL FLIGHT PATHS, SPACE NAVIGATION, CONTROL S YST
EMS, THRUST, CELESTIAL MECHANICS, PERTUR-BATION THEORY, MOTION, ERRORS,
CORRECTION, MATHEMATICAL ANALYSIS, EQUATIONS, THEORY.)   —
269 314   0459   EXPERIMENTS IN VERBAL BEHAVIOR.   II.   THE
REINFORCEMENT OF LINGUISTIC STRUCTURES USING AN ELECTRONIC VOICE
OPERATED RELAY.   I.   METHODOLOGICAL CONSIDERATIONS,

269 314   0459   NO ABSTRACT AVAILABLE

269 314   0457   (*VERBAL BEHAVIOR, LANGUAGE, TEST METHODS, CONDITIONED
REFLEX.)   (*VOICE COMMUNICATION SYSTEMS, ELECTRONIC EQUIPMENT, CIRCUITS.
)   —
269 315   0460   CONTROL SYSTEMS STUDIES.

269 315   0460   CIRCUIT STUDIES WERE CONDUCTED FOR AN ADVANCED
CONTROL SYSTEM AND SOME CIRCUIT UNITS WERE PACKAGED.   CONTROL SENSORS
AND POWER SERVOS WERE INVESTIGATED AND TESTED.   A BATTERY EVALUATION
PROGRAM WAS CONTINUED AND FUEL CELLS WERE INVESTIGATED.   ADVANCED
CONTROL SYSTEMS, INCLUDING A MERCURY HOOP MOTOR AND A REACTION WHEEL
PLATFORM, WERE DEVELOPED.

269 315   0458   (*GUIDED MISSILES, SURFACE TO SURFACE, *CONTROL SYSTEMS
, ELECTRONIC CIRCUITS, SWITCHING CIRCUITS, POWER SUPPLIES, G UIDED MISS
ILE BATTERIES, FUEL CELLS, SERVO SYSTEMS, GYROSCOPES, ACCELEROMETERS, MO
NITORS, DETEC-TORS, SERVOMECHANISMS, RELIABILITY, TESTS.)   —
269 317   0461   ON THE UNSTABLE ROLLING MOTIONS OF SHIPS RESULTING
FROM NONLINEAR COUPLING WITH PITCH INCLUDING THE EFFECT OF DAMPING IN
ROLL,

269 317   0461   THE EQUATIONS OF MOTION FOR A SHIP PITCHING AND
ROLLING IN A CALM SEA WERE FOUND TO BE COUPLED BY MEANS OF A SECOND
ORDER TERM IN THE ROLLING EQUATION OF MOTION.   WHEN THE PITCHING MOTION
IS SIMPLE HARMONIC THE EQUATION OF MOTION IN ROLL IS OF THE MATHIEU
TYPE, THE TWO INDEPENDENT PARAMETERS BEING PITCHING AMPLITUDE AND
FREQUENCY. THE STABILITY DIAGRAM OF THE MATHIEU EQUATION INCLUDING THE
EFFECT OF LINEAR DAMPING IS DETERMINED THEORETICALLY AND VERIFIED BY
SOLVING THE MATHIEU EQUATION ON AN ANALOGUE COMPUTER.   IN EXPERIMENTS
WITH ONE SHIP MODEL FORM, IT WAS FOUND THAT THE TRANSITION FROM STABLE
TO UNSTABLE MOTION OCCURRED FOR THE VALUE OF THE PARAMETERS PREDICTED
BY THE THEORY, AND THAT THE ROLLING MOTIONS OBTAINED EXPERIMENTALLY
CLOSELY RESEMBLED THE COMPUTER SOLUTIONS.   IT WAS CONCLUDED THAT   (1)
UNSTABLE ROLLING MOTIONS ARE POSSIBLE FOR VERY SMALL PITCHING
AMPLITUDES, (2) WHEN THE NATURAL FREQUENCY OF PITCH IS TWICE THAT OF
ROLL THE AMPLITUDE REQUIRED TO PRODUCE UNSTABLE MOTION IS A MINIMUM,
AND (3) FOR ANY PITCHING FREQUENCY, THE GREATER THE AMOUNT OF DAMPING,
THE GREATER THE AMPLITUDE OF PITCHING MUST BECOME TO PRODUCE UNSTABLE
ROLLING MOTIONS.

269 317   0459   (*SHIPS, MOTION, PITCH, DAMPING, *HYDRODYNAMICS, STABIL
ITY, SEA WATER, ROLL.) (*SHIP MODELS, ANALOG COMPUTERS, ANALYSIS, THEORY
, FREQUENCY, MOMENTS, TESTS, TEST EQUIP-MENT.) (HARMONIC ANALYSIS, DIFF
ERENTIAL EQUATIONS, LEAST SQUARES METHOD, VECTOR ANALYSIS.)   —

269 326   0463   ON ONE DIMENSIONAL HYDROMAGNETIC FLOW WITH
TRANSVERSE MAGNETIC FIELD, PART I.   SIMPLE WAVE FLOW, PART II.   FLOW IN
A CHANNEL WITH SMALL AREA VARIATIONS,

269 326   0463   THE ONE-DIMENSIONAL NON-STEADY MOTION OF AN IDEAL,
INVISCID, PERFECTLY CONDUCTING FLUID SUBJECTED TO A TRANSVERSE MAGNETIC
FIELD IS STUDIED.   THE PARTICLE VELOCITY, LOCAL SPEED OF SOUND,
SPECIFIC ENTROPY, DENSITY, SQUARE OF   ALFVEN SPEED, PERMEABILITY AND
RATIO OF SPECIFIC HEAT AT CONSTANT PRESSURE AND AT CONSTANT VOLUME ARE
CONSIDERED.   PARTIAL   DERIVATIVES ARE DENOTED BY SUBSCRIPTS, AND ALL
DEPENDENT VARIABLES ARE FUNCTIONS OF X AND T.

269 326   0461   (*FLUID FLOW, HYDRODYNAMICS, MAGNETIC FIELDS, *WAVE AN
ALYSIS, GAS FLOW, WAVE TRANSMISSION, SHOCK WAVES, *MAGNETOHYDRO-DYNAMICS
.) (PARTICLES, VELOCITY, THERMO-DYNAMICS, SPECIFIC HEAT, PRESSURE, ENTR
OPY.) (PERTURBATION THEORY, DIFFERENTIAL EQUATIONS.)   —
269 340   0464   DEVELOPMENT OF MAGNET WIRES CAPABLE OF OPERATION AT
850 C AND UNDER NUCLEAR RADIATION.

269 340   0464   REFRACTORY COATINGS, ALUMINUM COATINGS,   NICKEL.)
(COPPER, GRAINS (METALLURGY), CRYS TALS, GROWTH.) MANUFACTURING
METHODS, PROC ESSING, AGING, DRAWING (MACHINE PROCESSING),   FLAME
SPRAYING, ENCAPSULATION.   CLAD CU WIRES DIFFUSION OF CLADDING WITH
CONDUCTOR WAS MINIMIZED BY USE OF A REFRACTORY METAL BARRIER OR A
REFRACTORY OXIDE BARRIER LAYER.   IN A CU-BASED CONDUCTOR, GRAIN GROWTH
WAS MINIMIZED BY NUCLEATING THE CORE METAL WITH FINELY DIVIDED
REFRACTORY OXIDES.   OXIDATION RESISTANCE OF CLADDING SHEATHS WAS
ACHIEVED BY ALUMINIZING NI OR UTILIZING DUCTILE OXIDATION RESISTANT
ALLOYS.   CLAD AG WIRES SHOWED NO SIGNIFICANT CHANGE IN RESISTANCE IN AR
AT 850 C IN OVER 1300 HR.   THIS INDICATES A LACK OF A DIFFUSION PROBLEM
WITH THIS WIRE.   MOUNTED SPECIMENS OF AGED CLAD AG WIRES SHOWED NO
OBJECTIONABLE GRAIN GROWTH.   A WIRE MADE UP OF CU-FE-NI WAS ADEQUATE
FOR 500 C USE.   TWO WIRE INSULATIONS BASED ON HIGH EXPANSION
COEFFICIENT INGREDIENTS WERE MADE 1000 C FOR CUBASED CONDUCTORS AND 900
C FOR AG-BASED CONDUCTORS.   ENCAPSULATION TECHNIQUES ARE BEING
EXPLORED.

269 340   0462   (*MAGNETS, *WIRE, *COPPER WIRE, *SILVER WIRE, CONDUCTOR
S, RESISTANCE, OXIDA-TION, CONTAMINATION, SPACE ENVIRONMENTAL CONDITIONS
, RADIATION EFFECTS, THERMAL STRESSES, ELECTRIC INSULATION, *INSULATING
MATERIALS, METAL COATINGS, CERAMIC COATINGS.   — ·
269 344   0465   BIBLIOGRAPHY OF RESEARCH AND DEVELOPMENT REPORTS.

269 344   0465   THIS BIBLIOGRAPHY APPLIES TO THE TITAN MISSILE
PROGRAM.   IT LISTS RESEARCH AND DEVELOPMENT REPORTS PREPARED UNDER
CONTRACTS AF 04(645)-8 AND AF 04(647)-521, AND INCLUDES REPORTS
SUBMITTED BY SUBCONTRACTORS, IF APPLICABLE.   PROPOSALS AND SPECIAL
REPORTS ARE NUMBERED IN SPECIAL SERIES WHICH INCLUDE ALL SUCH DOCUMENTS
PREPARED AND ISSUED BY THE LIQUID ROCKET PLANT, AEROJET-GENERAL
CORPORATION.   THE DOCUMENTS IN THE OTHER CATEGORIES ARE NUMBERED ·
CONSECUTIVELY FOR THIS CONTRACT.   REPORTS PERTAINING TO COSTS, ·
ADMINISTRATION, CONSTRUCTION PROGRESS, OTHER CONTRACTS, AND OTHER
FIELDS NOT DIRECTLY RELATED TO THE TECHNICAL PROGRESS OF THE PROGRAM
ARE EXCLUDED.

269 344   0463   (*GUIDED MISSILES, SURFACE TO SURFACE, *BIBLIOGRAPHY.)
(*SCIENTIFIC RE-SEARCH, SCIENTIFIC REPORTS.)   —

269 349   0466   FUSION WELDING OF BERYLLIUM.

269 349   0466   THE STANDARD CONDITIONS USED FOR FUSION WELDING OF
BE ARE GIVEN. STUDIES OF THE EFFECTS OF POSTHEAT TREATMENT AND
FIXTURING ON FUSION WELDS ARE REPORTED, ALONG WITH LIMITED STUDIES OF
MILTIPLEPASS WELDING AND FILLET WELDING OF BE. THE EFFECTS OF RESIDUAL
IMPURITIES ON THE WELDABILITY OF BE ARE DISCUSSED RELATIVE TO THE BE
FILLER WIRE DEVELOPMENT PHASE. DRAWN BE WELDING WIRE WAS COATED WITH
CU, AG, AU, NI, FE, CO, SN, CR, ZN, AND CD THE EFFECTS OF THESE
COATED WIRES UPON THE FUSION WELD PROPERTIES OF BE ARE DESCRIBED.

269 349   0464   (*BERYLLIUM, *BERYLLIUM ALLOYS, WIRE, *ARC WELDING, ARC
 WELDS, WELDING, WELDS, MELTING, PROCESSING, MANUFACTURING METHODS.) (GR
AINS (METALLURGY), DEFORMATION, THICKNESS, TENSILE PROPERTIES, MECHANICA
L PROPERTIES, FRACTURE (MECHANICS), HEAT TREATMENT.) (METALS, OXIDES OR
 METAL COATINGS, ADDITIVES.)   -
269 350   0467   EFFECTS OF CONDUCTION AND VISCOSITY ON THE STABILITY
OF LAMINAR FLAME,

269 350   0467   THE EFFECTS OF CONDUCTION AND VISCOSITY ON THE
STABILITY OF LAMINAR FLAME ARE EXAMINED. IF L DENOTES THE RATIO OF
THE WAVE LENGTH OF A DISTURBANCE TO THE FLAME WIDTH AND ALPHA IS THE
RATIO OF THE ULTIMATE TEMPERATURE OF THE BURNED GAS TO THE INITIAL
TEMPERATURE OF THE FRESH MIXTURE, THE FLAME IS FOUND TO BE STABLE IF L
IS LESS THAN (OR EQUAL TO) 2 ALPHA/(ALPHA-1) MULTIPLIED BY 1/REPR WHERE
RE IS THE REYNOLDS NUMBER OF THE FLAME BASED ON THE FLAME WIDTH AND PR
DENOTES THE PRANDTL NUMBER OF THE MIXTURE. IT IS FURTHER SHOWN THAT
THE STABILIZATION IS ACHIEVED PRIMARILY THROUGH THE EFFECT OF HEAT
CONDUCTION ON THE FLAME SPEED RATHER THAN THE INFLUENCE OF VISCOSITY.

269 350   0465   (*LAMINAR BOUNDARY LAYER, *FLAMES, CONDUCTIVITY, VISCOS
ITY, STABILITY, *FLUID FLOW, GASES, EXHAUST GASES, MACH NUMBER.) (GAS I
ONIZATION, CHEMICAL REACTIONS, TEMPERATURE, HEAT, SPECIFIC HEAT, PRESSUR
E.) (MOLECULAR STRUCTURE, THEORY, GASES, LIQUIDS.) (PERTURBATION THEORY,
 EQUATIONS, DIFFERENTIAL EQUATIONS, PARTIAL DIFFERENTIAL EQUATIONS.)

269 355   0468   GROUND SUPPORT EQUIPMENT. FIGURE A (HARDENED AND
DISPERSEDO 9801 - 999). MINUTEMAN RE-ENTRY VEHICLE. MARK 5 MOD 3.

269 355   0468   NO ABSTRACT AVAILABLE

269 355   0466   (RECORDS OF *GROUND SUPPORT EQUIPMENT, *MAINTENANCE EQU
IPMENT, MAINTE-NANCE TOOLS FOR HANDLING AND SHIPPING AND MAINTENANCE OF
*RE-ENTRY VEHICLES.)   -
269 363   0469   ULTRASONIC TEMPERATURE DETERMINATIONS IN A PLASMA.

269 363   0469   AN ULTRASONIC PULSE TECHNIQUE FOR MEASURING GAS
TEMPERATURES IN AN INTERNAL COMBUSTION ENGINE WAS USED TO DETERMINE
TEMPERATURES IN AN ELECTRIC ARC PLASMA JET. MEASUREMENTS OF SOUND
VELOCITY AT ONE MC PER SEC WERE OBTAINED IN HIGHTEMPERATURE AIR, ARGON,
AND HELIUM AT ATMOSPHERIC PRESSURE. TEMPERATURES ARE CALCULATED FROM
THESE SOUND SPEEDS ON THE ASSUMPTION THAT ONLY THE TRANSLATIONAL AND
ROTATIONAL DEGREES OF FREEDOM ARE EXCITED BY THE SOUND WAVE, WHILE
VIBRATION, DISSOCIATION, AND ELECTRONIC EXCITATION REMAIN FROZEN. THE
TEMPERATURES DETERMINED IN THIS WAY RANGE FROM 3500 TO 8000 K. IN THE

CASE OF THE AIR ARC, THE ULTRASONIC TEMPERATURE MEASUREMENTS ARE
COMPARED WITH TEMPERATURES DETERMINED FROM AN ENERGY BALANCE ON THE
PLASMA JET. THE AVERAGE TEMPERATURES OBTAINED BY THE TWO METHODS AGREE
WITHIN 10 PERCENT OVER THE TEMPERATURE AND ENTHALPY RANGE CONSIDERED.
THE RESULTS ALSO SHOW THAT TEMPERATURE FLUCTUATIONS AS HIGH AS 50
PERCENT CAN OCCUR DURING A GIVEN ARC RUN. A DISCUSSION OF THE
EXPERIMENTAL APPARATUS, METHOD OF MEASUREMENT, EXPERIMENTAL RESULTS,
AND ANALYSIS IS PRESENTED.

269 363   0467   (*PLASMA PHYSICS, ULTRASONICS, SOUND TRANSMISSION, TEMP
ERATURE, MEASUREMENT, CRYSTALS, QUARTZ CRYSTALS, BARIUM COMPOUNDS, TITAN
ATES.) (TRANSPORT PROPERTIES, RELAXA-TION TIME, EXCITATION, RECOMBINATI
ON RADIOUS.) (INSTRUMENTATION, CAMERAS, OSCILLOSCOPES, PULSE GENERATORS,
 CATHODE TUBES.) (EQUATIONS, EXPERIMENTAL DATA.)   -
269 367   0470   INSPECTION-MAINTENANCE-REPLACEMENT SCHEDULES UNDER
MARKOVIAN DETERIORATION,

269 367   0470   IT IS ASSUMED THAT AN INSPECTION IS CAPABLE OF
SUPPLYING MORE INFORMATION ABOUT A SYSTEM'S CONDITION THAN JUST WHETHER
IT IS OPERATIVE OR INOPERATIVE. SPECIFICALLY, OUR ASSUMPTION IS THAT
THE DETERIORATION OF THE SYSTEM CAN BE DESCRIBED AS A DISCRETE TIME,
FINITE MARKOV CHAIN AND THAT THE INSPECTION PROCEDURE IS CAPABLE OF
DETECTING WHICH STATE THE SYSTEM IS IN AT THE TIME IT TAKES PLACE.
REPAIRS, IF MADE, CAN PUT THE SYSTEM IN ONE OF MANY POSSIBLE STATES,
THE AS NEW STATE BEING ONLY ONE OF THE AVAILABLE ALTERNATIVES. THE
PURPOSE WAS TO SHOW, FOR AN AVERAGE COST PER UNIT TIME CRITERION
FUNCTION, THAT THE PROBLEM OF FINDING AN OPTIMAL
INSPECTIONREPAIR-REPLACEMENT POLICY CAN BE FORMULATED IN LINEAR
PROGRAMMING TERMS.

269 367   0468   (*MANAGEMENT ENGINEERING, *RE-LIABILITY, QUALITY CONTRO
L, SAMPLING, *SCHED-ULING, STATISTICAL ANALYSIS, PROBABILITY, COSTS, LI
NEAR PROGRAMMING, LINEAR SYSTEMS.)   -
269 369   0471   MIXING AND DISPERSIVE ACTION OF WIND WAVES,

269 369   0471   THE MIXING AND DISPERSIVE ACTION OF WIND INDUCED
WATER WAVES WAS STUDIED IN A LABORATORY FLUME AT DIFFERENT WATER
DEPTHS, WIND SPEEDS, AND WAVE CONDITIONS. MEASUREMENTS OF THE SHAPE OF
THE DISPERSION PLUME WERE MADE, AND THE EFFECTS OF WAVE CHARACTERISTICS
ON THE LATERAL DIFFUSION COEFFICIENT WERE NOTED.

269 369   0469   (*WATER WAVES, *WIND, JET MIX-ING FLOW, TRANSPORT PROPE
RTIES, SEWAGE, DIF-FUSION, PARTICLES, DISTRIBUTION, EQUATIONS.) (HYDRAUL
IC MODELS, WATER TANKS, TESTS.)   -
269 371   0472   SYSTEM ANALYSIS TEST STANDS AND TRANSDUCERS,

269 371   0472   TWO TEST STANDS WERE DESIGNED AND BUILT TO AID IN
THE EVALUATION OF PROSTHETIC SYSTEMS AND COMPONENTS. THE FIRST, A
SYSTEMS TEST STAND, YIELDS TIME DATA ON AE PROSTHETIC SYSTEM
PERFORMANCE. THE SECOND, A COMPONENT TEST STAND IS SPECIFICALLY
DESIGNED FOR THE DETERMINATION OF ACTUATOR FORCE-LENGTH RELATIONSHIPS.
THE SYSTEMS TEST STAND CONSISTS OF ELBOW, FOREARM, VO HOOK, AND DUAL
CABLE CONTROL, AND IS POWERED BY 2 BPA'S, CONNECTED IN TANDEM. THE
TEST SPECIMEN IS OPERATED FROM THE CONTROL CHASSIS, WHILE PERFORMANCE
DATA ARE OBTAINED FROM SPECIAL TRANSDUCERS IN THE SYSTEM AND FROM

ELECTRICAL CONNECTIONS IN THE CONTROL CIRCUIT. THE COMPONENT TEST STAND INCORPORATES A FORCE TRANSDUCER, A VELOCITY TRANSDUCER, A LOADING PLATFORM, AND A VARIABLE DAMPER. WEIGHT LOADING OF THE TEST ACTUATOR CAN BE REPLACED BY CONSTANT FORCE SPRING LOADING WHERE INERTIA EFFECTS ARE NOT DESIRED. THIS TEST STAND WILL MAKE POSSIBLE THE COMPARATIVE EVALUATION OF PROSTHESIS ACTUATORS UNDER WIDELY VARIABLE CONDITIONS OF LOADING AND DAMPING.

269 371   0470   (*TRANSDUCERS, TEST EQUIPMENT, *TEST FACILITIES, SOLENO IDS, PNEUMATIC SYSTEMS, OPERATION, DESIGN.)   —
269 384   0473   LOW-ENERGY ELECTRON SCATTERING FROM ATOMIC OXYGEN,

269 384   0473   THE TOTAL CROSS SECTION FOR THE SCATTERING OF ELECTRONS BY ATOMIC O WAS MEASURED AS A FUNCTION OF ELECTRON ENERGY FROM 2.3 TO 11.6 EV. THE NUMBER OF ELECTRONS SCATTERED FROM A REGION DEFINED BY THE INTERSECTION OF AN ELECTRON BEAM AND A MODULATED MOLECULAR O BEAM WAS COMPARED WITH THE NUMBER SCATTERED WHEN THE O BEAM WAS PARTIALLY DISSOCIATED. A RADIO-FREQUENCY DISCHARGE DISSOCIATED ABOUT 30$ OF THE MOLECULES. THE DEGREE OF DISSOCIATION WAS MEASURED WITH A MASS SPECTROMETER. FROM THE DATA, THE RATIOS OF ATOMIC TO MOLECULAR SCATTERING CROSS SECTIONS WERE OBTAINED. THE ABSOLUTE ATOMIC VALUES WERE CALCULATED BY MULTIPLYING THESE RATIOS BY THE MOLECULAR O CROSS SECTIONS OBTAINED BY BRUCHE (ANN. PHYSIK 831065, 1957). THE RESULT IS A VIRTUALLY CONSTANT CROSS SECTION OF 6.2 + 0.5 A2O IN THE ENTIRE ENERGY RANGE STUDIED. THESE RESULTS ARE COMPARED WITH 5 THEORETICAL ESTIMATES.

269 384   0471   (*ELECTRONS, *ATTENUATION FROM *OXYGEN, ATOMS, ELECTRON GUNS, ELECTRON BEAMS, MOLECULAR BEAMS, RADIOFREQUENCY, GAS DIS-CHARGES, DISSOCIATION, IONIZATION, MEASURE-MENT, MASS SPECTROSCOPY.) (SCATTERIN G, ELECTRONS.)   —
269 386   0474   HANDBOOK OF FIBROUS MATERIALS.

NO ABSTRACT AVAILABLE

269 386   0472   (*HANDBOOKS, *TEXTILES, *SYNTHET-IC FIBERS, *FIBERS, CO RDAGE, NYLON, DACRON, DECELERATION, PARACHUTE FABRICS, COATINGS.) (PHYSI CAL PROPERTIES, MECHANICAL PROPERTIES, POROSITY, SEMIPERMEABILITY, CLIMA TIC FACTORS, RADIATION EFFECTS, TEMPERATURE, AERODYNAMIC HEATING, COOLI NG, AGING, FRICTION.) *BIBLIOGRAPHY.   —
269 387   0475   OBSERVED EMISSIVITIES OF ROCKET COMBUSTION GASES.

269 387   0475   THE TOTAL AND THE SPECTRAL INTENSITY OF THE RADIATION EMITTED BY ROCKET COMBUSTION PRODUCTS AT HIGH PRESSURE WAS STUDIED. SPECTRAL AND TOTAL RADIATION DATA ARE PRESENTED FOR 3 ROCKET PROPELLANT SYSTEMS HNO3 AND HN3 N2O4 AND NH3 AND N2O4 AND N2H4. EACH OF THE COMBINATIONS CONTAINED H2O AS THE PRINCIPAL RADIATING GAS. THE MEASUREMENTS WERE MADE AT A NOMINAL COMBUSTION PRESSURE OF 700 PSIA. EMISSIVITY CORRELATIONS AND METHODS OF ESTIMATING THE TEMPERATURE OF THE COMBUSTION GASES ARE DEVELOPED. A TECHNIQUE IS GIVEN FOR OBTAINING DIRECT OBSERVATION OF HIGH TEMPERATURE GASES INSIDE THE COMBUSTION CHAMBER OF A SMALL ROCKET MOTOR.

269 387   0473   (ROCKET MOTORS, LIQUID ROCKET PROPELLANTS, COMBUSTION, *COMBUSTION CHAMBER GASES, *EXHAUST GASES, PRESSURE, TEMPERATURE, *THERMAL RADIATION, INFRARED RADIATION, IN-FRARED SPECTROSCOPY, DETECTION, MEASUREMENT, TESTS, THEORY, MATHEMATICAL ANALYSIS.)   (NITRIC ACID, AMMONIA, HYDRAZINES, NITROGEN COMPOUNDS, TETROXIDES.)   (TEST EQUIPMENT, INFRARED DE-TECTORS, THERMOPILES, DETECTORS.)   (TEST METH-ODS, SPECTROGRAPHIC ANALYSIS.)   -

269 388   0476   ELECTRIC PROPULSION SYSTEMS.   APPENDIX 1.

269 388   0476   A DETAILED DISCUSSION OF ONE PHASE OF THE LOW MAINTENANCE MACHINERY STUDY PROGRAM IS PRESENTED IN SUPPORT OF THE FINAL REPORT (AD-327 314).   DIRECT CURRENT-, ALTERNATING-, AND ACYCLICELECTRIC MOTOR SYSTEMS WERE CONSIDERED.

269 388   0474   (*SUBMARINE ENGINES, MAIN PRO-PULSION PLANTS, *ELECTRIC PROPULSION, UNDER-WATER PROPULSION, *NUCLEAR PROPULSION, ELECTRIC MACHINERY, DIRECT CURRENT, ALTERNATING CURRENT, DESIGN, CONFIGURATION, EFFECTIVENESS, MAINTE-NANCE, RELIABILITY, SUBMARINE NOISE.)   -

269 145   0477   THE FRACTURE ANALYSIS OF ALUMINA USINGTHE ELECTRON MICROSCOPE.

269 145   0477   STRESSES, MECHANICAL PROPERTIES, TEST METH ODS, ELECTRON MICROSCOPY.)   (GRINDING WHEELS,   MATERIALS, GRAINS (METALLURGY), THERMAL   CONDUCTIVITY.)   A MODEL SYSTEM OF PURE HOT PRESSED AL203 WAS USED TO STUDY THE EFFECT OF TEMPERATURE ON THE TRANSVERSE STRENGTH AND TYPE OF FRACTURE IN POLYCRYSTALLINE MATERIAL. THE TYPE OF FRACTURE DEPENDS UPON THE RELATIONSHIP OF CRYSTALLINE TO INTERCRYSTALLINE BOND STRENGTHS.   IN PARTICULAR, IT WAS FOUND THAT THESE STRENGTHS WERE EQUAL IN HOT PRESSED AL203 AT VERY NEARLY 1200 C. THIS IS CALLED THE EQUICOHESIVE TEMPERATURE.   THE TRANSVERSE STRENGTH DECREASED RAPIDLY ABOVE THE EQUICOHESIVE TEMPERATURE WHERE THE FRACTURE WAS ENTIRELY INTERGRANULAR.   SAMPLES OF FUSED AL203 MADE DIRECTLY FROM BAUXITE WERE STUDIED WITH THE AID OF THE ELECTRON MICROSCOPE AND THE METALLOGRAPH TO RELATE THE ABRASIVE CHARACTER OF THREE TYPES OF THIS PRODUCT TO ITS MICROSTRUCTURE.   IT WAS SPECULATED THAT FOR HIGH PRESSURE GRINDING WHEELS OF AGGLOMERATED FINE GRAINED AL203 WOULD GIVE A LOWER BREAKDOWN RATE THAN THE SAME SIZED MONOCRYSTALLINE GRIT USED IN A BONDED ABRASIVE WHEEL.

269 145   0475   (*FRACTURE (MECHANICS), CRYS-TALS, *ALUMINUM COMPOUNDS, *OXIDES, IMPURITIES, MICROSTRUCTURE, HIGH TEMPERATURE RESEARCH.   -

269 146   0478   ONGOING VISUAL MONITORING PROCEDURES FOR EXPERIMENTAL ANALYSIS AND CONTROL.   PART I MACHINE DEFINITION OF ONGOING SILENT AND ORAL READING RATE.   PART II - A MULTI-PURPOSE PERCEPTUAL DEVICE,

269 146   0478   PROCEDURES FOR CONTROLLED ALTERATION AND DEFINITION OF ONGOING READING ARE PRESENTED.   READING NOT ONLY HAS INTRINSIC INTEREST, BUT CAN ALSO BE CONSIDERED AS A FORM OF VISUAL MONITORING OF A COMPLEX DISPLAY, IN WHICH THE BEHAVIORS REQUIRED HAVE LINEAR SEQUENCES.   A PAGE IS PROJECTED ON A SCREEN, WITH THE SUBJECT REQUIRED TO READ ALOUD, OR SILENTLY.   THROUGH THE SAME OPTICAL SYSTEM, AN OPAQUE LOOP IS PROJECTED.   A TRANSPARENT SLIT ON THE OPAQUE LOOP EXPOSES PART OF A LINE WITH EACH FRAME, THE SLIT MOVES LINEARLY AND SEQUENTIALLY EXPOSING SUCCESSIVE READING MATERIAL.   RECYCLING OF THE LOOP TRIGGERS

OFF PRESENTATION OF ANOTHER PAGE. CONTROL OF EACH FRAME OF THE LOOP IS
BY THE SUBJECT, WHO PRESSES A MICRO-SWITCH TO ADVANCE THE FRAME,
THEREBY EXPLICITLY DEFINING A READING RESPONSE. THE PROCEDURE IS
SENSITIVE TO VARIABLES SUCH AS SIGNALNOISE RATIO, ITEM DIFFICULTY,
TRANSIENT AND LONG-TERM EFFECTS, PAY-OFFS (CONTINGENCIES) ATTACHED TO
RESPONDING, AGE. PROCEDURES ARE SUGGESTED FOR TRAINING SUBJECTS TO BE
DIFFERENTIALLY ATTENTIVE TO DIFFERENT PARTS OF A DISPLAY. COMMERCIALLY
AVAILABLE EQUIPMENT IS DISCUSSED WHICH CAN BE USED FOR SCHEDULED
PRESENTATION AND CONTROL OF RESPONSES IN THE MAJOR PSYCHOPHYSICAL
METHODS, FOR BOTH HUMAN AND ANIMAL MONITORING RESEARCH.

269 146   0476   *READING, BEHAVIOR, VISUAL PER-CEPTION, EFFECTIVENESS,
TEST EQUIPMENT, MONI-TORS, MOTION PICTURE PROJECTORS.   -
269 148   0479   QUARTERLY RESEARCH REVIEW NO. 30, 1 MAY31 JULY 61.

       NO ABSTRACT AVAILABLE

269 148   0477   (REINFORCING MATERIALS, GLASS TEXTILES, *PHENOLIC RESIN
S, MECHANICAL PROP-ERTIES.) (*BORON, PREPARATION, PURIFICA-TION.) (NUC
LEAR PHYSICS, *RADIOACTIVE DECAY.) (ETHYLENE, NITROGEN COMPOUNDS, FLUORI
DES, COM-BUSTION.) (ELECTRONICS, ATMOSPHERICS, *NOISE ANALYZERS, THEORY
.) (GASES, *MAGNETOHYDRODY-NAMICS, PLASMA PHYSICS, PLASMA JETS, HIGH TE
M-PERATURE RESEARCH.) (*HYPERSONIC WIND TUNNELS, HYPERSONICS, RE-ENTRY
AERODYNAMICS, AERODY-NAMIC HEATING, SIMULATION.) (SOLID STATE PHYSICS,
ELECTRONS, TRANSPORT PROPERTIES.)   -
269 151   0480   INNOVATIONS IN MOTOR VEHICLE ENGINEERING.

269 151   0480   SUCCESSFUL EXPERIMENTS WITH PIEZOELECTRIC IGNITION
INDICATE THAT IN THE FUTURE, THIS IGNITION WILL COME INTO USE. THE
ADVANTAGE OF THE NEW PIEZOELECTRIC IGNITION SYSTEM IS ITS SIMPLE DESIGN
AND CONSEQUENTLY ITS LOW PRICE FURTHER, IT NEEDS LITTLE SPACE (THE
IGNITION SYSTEM FOR A ONE-CYLINDER MOTOR FITS INTO A SPACE OF 56 CUBIC
CENTIMETERS AND WEIGHS 0.24 KILOGRAMS). THE LIFE SPAN OF THE
PIEZOELECTRIC SYSTEM IS VERY LONG IT WITHSTOOD 1,000 HOURS OF TESTING
IN A ـ-CYLINDER 2-PHASE MOTOR. ITS LIFE-SPAN WAS LIMITED NOT BY THE
CRYSTAL BUT BY MECHANICAL WEAR OF THE METAL PARTS. THE CRYSTAL
LIFE-SPAN IS FIVE TIMES THAT OF THE MOTOR.

269 151   0478   (*IGNITION SYSTEMS, *PIEZOELEC-TRIC CRYSTALS, USSR.) (P
IEZOELECTRIC MATERIALS, ZIRCONIUM, TITANIUM, CERAMIC MATERIALS, LIFE EXP
ECTANCY, TESTS.) (VEHICLES, MOTORCYCLES, ELECTRICAL EQUIPMENT, IGNITIO
N SYSTEMS.)   -
269 157   0481   STANDARD RELIABILITY COEFFICIENT OF ELECTRONIC
PRODUCTS,

269 157   0481   THE CONCEPT OF RELIABILITY OF MASS PRODUCTS OF THE
RADIO ENGINEERING INDUSTRY IS DISCUSSED. THE ERRORS COMMITTED DURING
THE TESTING OF GOODS CAN BE ELIMINATED BY INTRODUCING THE CONCEPT OF
STANDARD RELIABILITY, UNDER WHICH IT SHOULD BE UNDERSTOOD THAT THE
CONFORMITY OF THE MANUFACTURED GOODS MUST COMPLY WITH STANDARDS AND
TECHNICAL REQUIREMENTS REVEALED IN THE PROCESS OF SELECTIVE PLANT TESTS
OF THEIR FUNCTIONAL PROPERTIES. THE CONCEPT OF STANDARD RELIABILITY
PERMITS A QUANTITATIVE EVALUATION OF THE PRODUCTION QUALITY BY EACH
TYPE OF TEST SEPARATELY, AND BY ALL TYPES OF TESTS TAKEN TOGETHER, AND
ALSO DETERMINES THE PERCENTAGE OF SERVICEABLE PRODUCTION AND REJECTS IN
THE ENTIRE BATCH OF GOODS BY DIVIDING THE LATTER INTO SEPARATE TYPES.

269 157   0479   (USSR, *ELECTRONIC EQUIPMENT, PRODUCTION, STANDARDS, *R
ELIABILITY, MATHE-MATICAL ANALYSIS.)   -
269 160   0482   INVESTIGATIONS OF HEAT RESISTANT ALLOYS (SELECTED

           NO ABSTRACT AVAILABLE

269 160   0480   (*HEAT RESISTANT ALLOYS,   *CORROSION-RESISTANT ALLOYS,
HIGH TEMPERATURE RESEARCH, STAINLESS STEEL, AUSTENITE, STEEL, TITANIUM
ALLOYS, ALUMINUM ALLOYS, TUNGSTEN ALLOYS, SILICON ALLOYS, CHROMIUM ALLOY
S, BORON ALLOYS.) (TESTS, CRYSTAL STRUCTURE, GRAINS (METALLURGY), MECHA
NICAL PROPERTIES, PHYSICAL PROPERTIES, SURFACE PROPERTIES.) (AIRCRAFT, H
YPERSONICS, SUPERSONIC PLANES, GAS TURBINE BLADES FOR JET ENGINES, NUCLE
AR POWER PLANTS.) USSR.   -
269 174   0483   A FUNDAMENTAL STUDY OF ROLLING CONTACT FATIGUE.

           NO ABSTRACT AVAILABLE

269 174   0481   (*FATIGUE (MECHANICS), LUBRICA-TION, ROLLER BEARINGS, B
ALL BEARINGS.)   (*SINGLE CRYSTALS, *LITHIUM COMPOUNDS, *FLUORIDES, ST
RESSES, ELASTICITY, MECHANICAL PROPERTIES, CHEMICAL MILLING, ABRASION, P
ICKLING.) TEST EQUIPMENT.   -
269 177   0484   INVESTIGATION OF GLASS FIBER STRENGTH ENHANCEMENT
THROUGH BUNDLE DRAWING.
           NO ABSTRACT AVAILABLE

269 177   0482   (BRITTLE MATERIALS, GLASS,   FIBERS, *GLASS TEXTILES, *C
ERAMIC FIBERS,   COATINGS, MECHANICAL PROPERTIES, THEORY,   METAL COATINGS
, LEAD ALLOYS, INDIUM ALLOYS, ALUMINUM ALLOYS, SILICON ALLOYS.) (MANUFA
C-TURING METHODS, *DRAWING (MACHINE PROCESSING), INDUSTRIAL EQUIPMENT.)
    -

269 186   0485   SYNCHROTRON RADIATION AS THE SOURCE OF THE POLARIZED
DECIMETER RADIATION FROM JUPITER.

269 186   0485   A STOKES PARAMETER DESCRIPTION IS DEVELOPED FOR
SYNCHROTRON RADIATION FROM A GROUP OF ULTRARELATIVISTIC ELECTRONS WITH
ANY SPECIFIED DISTRIBUTION OF POSITIONS, ENERGIES AND DIRECTIONS OF
MOTION. THIS DESCRIPTION IS USED TO STUDY THE RADIATION FROM A SHELL
OF ULTRARELATIVISTIC ELECTRONS TRAPPED IN A DIPOLE FIELD. IT IS FOUND
THAT THE POLARIZATION OBSERVED FOR THE 31-CM RADIATION FROM JUPITER
COULD BE OBTAINED FROM SUCH SHELLS PROVIDED A LARGE NUMBER OF THE
ELECTRONS HAVE RELATIVELY FLAT HELICES.

269 186   0483   (*JUPITER, MARS, SYNCHROTRONS, POLARIZATION, ELECTROMA
GNETIC WAVES, COSMIC RAYS, RADIO ASTRONOMY, *EXTRATERRESTRIAL RADIO WAV
ES, PLASMA PHYSICS.) (PARTICLES, TERRESTRIAL MAGNETISM, OPTICS, GALAXIES
, NEBULAE, ATMOS-PHERIC ELECTRICITY, MAGNETIC STORMS, MAGNETOHY-DRODYNAM
ICS, PLANETS, SUPER HIGH FREQUENCY, ULTRA HIGH FREQUENCY.) (VAN ALLEN R
ADIATION BELT, SOLAR ENERGY, GASES IONIZATION, HIGH TEMPERATURE RESEARCH
, IONOSPHERE, MASER.) (GEOMETRY, DIFFERENTIAL EQUATIONS, DIFFRACTION GRA
TINGS, MAGNETO-OPTIC ROTATION, DIFFERENCE EQUATION, BESSEL FUNCTIONS.)
(ELECTRONS, PROTONS, RELATIVITY THEORY.)   -
269 187   0486   SONIC FATIGUE RESISTANCE OF STRUCTURAL DESIGNS.

269 187   0486   RESEARCH ON SOUND-INDUCED FATIGUE OF FLIGHT VEHICLE
PANELS IS DESCRIBED. PRIMARY EMPHASIS IS PLACED ON THE PROBLEMS OF
PANEL RESPONSE AND PANEL STRAIN CONCENTRATION SECONDARY EMPHASIS IS
PLACED ON THE ACQUISITION OF FATIGUE DATA. SEVERAL PANEL DESIGNS WERE
CONSIDERED, INCLUDING BOTH IDEALIZED PANELS AND PANELS OF MORE
PRACTICAL DESIGN. PROCEDURES FOR THE IMPROVEMENT OF SONIC FATIGUE
RESISTANCE, AND FOR THE TESTING OF PANELS WITH SIREN SOUND SOURCES,

HAVE BEEN DERIVED FROM THE STUDY. THEORETICAL AND/OR EXPERIMENTAL
STUDIES ARE PRESENTED ON LINEAR RESPONSE, ANGLE-OF-INCIDENCE EFFECTS,
SANDWICH CONSTRUCTION, STRAIN CONCENTRATIONS IN SUBSTRUCTURES,
NONLINEAR RESPONSE, FATIGUE OF NOTCHED PANELS, AND FATIGUE AT RIVET
LINES.

269 187   0484   (*AIRPLANE PANELS, SANDWICH PANELS, AIRFRAMES, RIVETED
JOINTS, ACOUSTICS, SOUND, *NOISE, *FATIGUE (MECHANICS), DYNAMICS, DEFORM
ATION, STRESSES, MEASUREMENT, MATHE-MATICAL ANALYSIS.)   -
269 193   0487   UNICOM. UNIVERSAL INTEGRATED COMMUNICATIONS SYSTEM.

269 193   0487   THE FIRST PARTIAL DRAFT OF THE SYSTEM ENGINEERING
PLAN WAS ISSUED. NETWORK PLANNING, ANALYSES OF THE SURVIVABILITY OF
THE PHASE I AND PHASE II VERSIONS OF UNICOM IS REPORTED. THE MAJOR
WORK IN SWITCHING AND SIGNALING HAS BEEN IN SUPPORTING TEST MODEL
DEVELOPMENT AND IN PREPARING DETAILED REQUIREMENTS FOR INCLUSION IN THE
SYSTEM ENGINEERING PLAN. TRANSMISSION AND STATIONS, WORK ON THE
TRANSMISSION ASPECTS CONNECTING UNICOM TO SIGNAL CORPS AUTOMATIC
NETWORK (SCAN) AND INDIGENOUS TELEPHONE COMPANIES WAS COMPLETED. OTHER
WORK ON TRANSMISSION FACILITIES AND DIGITAL SIGNAL CONVERTERS WAS
CARRIED ON.

269 193   0485   (*MILITARY COMMUNICATIONS, COMMUNICATION SYSTEMS, DESIG
N.) (DATA STORAGE SYSTEMS, DATA TRANSMISSION SYSTEMS, DIGITAL SYSTEMS.)
(COMPUTERS, SWITCHING CIRCUITS, COMPUTER LOGIC, MEMORY DEVICES.) (*RA
DIO COMMUNICATION SYSTEMS, *VOICE COMMUNICATION SYSTEMS.) ANALOG-TO-DIG
ITAL CONVERTERS.   -
269 194   0488   STUDY OF A SPEECH COMPRESSION SYSTEM (SPECTRUM
SELECTION).

269 194   0488   THE EFFECTS OF SAMPLING THE FREQUENCY SPECTRUM OF
SPEECH BY NARROW PASS BANDS IS DISCUSSED. INCLUDED IS ENGINEERING
INFORMATION ABOUT A NEW 6-CHANNEL FILTERING SYSTEM, EACH CHANNEL OF
WHICH IS CAPABLE OF PASSING A BAND OF FREQUENCIES EITHER 35 OR 75 CPS
WIDE. ALSO INCLUDED ARE RESULTS OF EXPERIMENTS ON COMPANDING, DELTA
MODULATION AND STRAIGHT PULSE CODE MODULATION OF A SPEECH SIGNAL.
PRELIMINARY RESULTS INDICATE THAT THE 75 CPS WIDE FILTERS, DELTA
MODULATION AND COMPANDING CAN BE USED TO ADVANTAGE IN THE TRANSMISSION
OF SPECTRUM SAMPLED SPEECH. (AUTHOR)

269 194   0486   (*VOICE COMMUNICATION SYSTEMS, *SPEECH TRANSMISSION, EL
ECTRONIC EQUIPMENT, TEST EQUIPMENT.) (*BAND-SELECTIVE AMPLIFIERS, BAND
-PASS AMPLIFIERS, *BAND-PASS FILTERS, ACOUSTIC FILTERS.) (*PULSE MODULA
TION, PULSE GENERATORS, DIGITAL SYSTEMS, ANALOG-TO-DIGITAL CONVERTERS, T
IMING CIRCUITS, MEMORY DEVICES.) (PSYCHOACOUSTICS, INTELLIGIBILITY.) (*
VOICE COMMUNICATION SYSTEMS, INTELLIGIBILITY.) NOISE GENERATORS.   -
269 195   0489   ESTABLISHING PROVEN DESIGN CRITERIA FOR CRYOGENIC
BOOST TANKS.

269 195   0489   THE DESIGN AND FABRICATION OF TWO 7000 GAL LIQUID
HYDROGEN FUEL TANKS OF TI AND STAINLESS STEEL ARE DESCRIBED.
INSULATING MATERIALS AND METHODS OF INSULATION ARE ALSO DESCRIBED.
TESTS WERE SUCCESSFULLY CONDUCTED TO CHECK OUT THE TANK DRAIN
ASSEMBLY. FURTHER TESTS WILL BE CONDUCTED TO DETERMINE THE HEAT
TRANSFER OF THE TANKS DURING SIMULATED ROCKET FLIGHT CONDITIONS.

269 195 .0487   (LIQUID ROCKET PROPELLANTS, CRYOGENICS, *PROPELLANT TAN
KS, FUEL TANKS, PROPELLANT TANK LINERS, INSULATING MATERIALS, DESIGN, PR
OCESSING, HEAT TRANSFER, AERODYNAMIC HEATING, TEST METHODS, TEST EQUIPME
NT.) (LIQ-UEFIED GASES, HYDROGEN.) THERMAL INSULATION.   -
269 198   0490   QUADRATIC VARIATIONAL PROBLEMS INVOLVING HIGHER
ORDER, ORDINARY DERIVATIVES.

269 198   0490   A QUADRATIC FUNCTIONAL J(X) INVOLVING ORDINARY
DERIVATIVES OF HIGHER ORDER IS STUDIED. THE SELF-ADJOINT, LINEAR
OPERATOR T ASSOCIATED WITH J(X) IS IN GENERAL AN INTEGRO-DIFFERENTIAL
OPERATOR. THE STUDY OF J(X) IS OF COURSE EQUIVALENT TO THE STUDY OF A
PROBLEM OF BOLZA, INVOLVING ONLY FIRST ORDER DERIVATIVES. HOWEVER, IT
IS DESIRABLE TO STUDY J(X) DIRECTLY, WITHOUT TRANSFORMING THE PROBLEM,
AND TO ASCERTAIN THE NATURE AND FORM OF THE CONSEQUENT RESULTS. THE
RESULTS PRESENTED DEPEND FUNDAMENTALLY ON AN EXTENSION OF THE
FUNDAMENTAL LEMMA IN THE CALCULUS OF VARIATIONS. THE EXTENSION OF
THAT LEMMA IS FORMULATED IN TERMS OF THE LEBESGUE-STIELTJES INTEGRAL.

269 198   0488   (*CALCULUS OF VARIATIONS, OPERATORS (MATHEMATICS), FUN
CTIONAL ANALYSIS, TOPOLOGY, *DIFFERENTIAL EQUATIONS, INTEGRAL EQUATIONS,
 TRANSFORMATIONS (MATHEMATICS), LINEAR SYSTEMS.)   -
269 200   0491   THE SELF DIFFUSION OF LEAD - 210 IN SINGLE CRYSTALS
OF LEAD SULFIDE AS A FUNCTION OF STOICHIOMETRY AND DOPING ADDITIONS,

269 200   0491   MEASUREMENTS OF THE SELF DIFFUSION OF PB-210 INTO
UNDOPED AND DOPED SINGLE CRYSTALS OF PBS OF KNOWN DISLOCATION DENSITY
HAVE SHOWN THAT IN THE TEMPERATURE RANGE OF 500 TO 800 C, THE DIFFUSION
IS PREDOMINANTLY VIA FRENKEL DEFECTS. IN THE CASE OF N-TYPE, UNDOPED
PBS AND P-TYPE, AG DOPED PBS THE DIFFUSION COEFFICIENTS WERE LARGER
THAN FOR UNDOPED, STOICHIOMETRIC PBS. CONVERSELY FOR P-TYPE, S EXCESS
UNDOPED PBS AND FOR N-TYPE, BI DOPED SOLID SOLUTIONS, THE DIFFUSION
COEFFICIENTS WERE LARGER THAN FOR UNDOPED STOICHIOMETRIC PBS.

269 200   0489   (*LEAD, DIFFUSION, *SINGLE CRYS-TALS, *LEAD COMPOUNDS,
*SULFIDES, IMPURITIES, BISMUTH, SILVER, SULFUR, TEST METHODS.) (SEMI-CO
NDUCTORS, LABELED SUBSTANCES, CONTROLLED ATMOSPHERES, HIGH TEMPERATURE R
ESEARCH.)   -
269 203   0492   PENTABORANE THERMAL STABILITY AT TEMPERATURES OF 100
DEGREES C. 125 DEGREES C AND 150 DEGREES C FOR 7 PERCENT ULLAGE,

269 203   0492   THE THERMAL STABILITY OF B5H9 WAS DETERMINED AS THE
RATE OF PRESSURE INCREASE IN 800-ML TEST CYLINDERS FILLED TO 7$
ULLAGE. DECOMPOSITION OF THE B5H9 RESULTED IN PRESSURE INCREASES FROM
 3 TO 1200 PSIG (APPROXIMATELY 6$ DECOMPOSITION OF B5H9) AT
TEMPERATURES OF 100, 125 AND 150 C AFTER 360, 28 AND 3 HR,
RESPECTIVELY. AT LONG HOLD TIMES AND HIGH TEMPERATURES THE PREDICTED
PERCENT DECOMPOSITION WAS HIGHER THAN THE OBSERVED PERCENT
DECOMPOSITION. INVESTIGATIONS WERE MADE TO DETERMINE THE EFFECTS OF H
AND   B10H14 ON PENTABORANE THERMAL STABILITY AFTER 138 HR, AT A
TEMPERATURE OF 110 C AND AN ULLAGE OF 52$. THE ADDITION OF 26.8 MOL-$
H (APPROXIMATELY 1175 PSIG) FOR ONE TEST AND 9.2 MOL-$ B10H14 FOR
ANOTHER TEST RESULTED IN 6.5$ AND 8.1$ DECOMPOSITION. A BLANK B5H9
TEST RESULTED IN A 10.3$ DECOMPOSITION.

269 203   0490   (*PENTABORANES, FUELS, ADDITIVES, HYDROGEN, DECABORANES
.) (TEST METHODS, TEMPERATURE, STABILITY, DECOMPOSITION, PHASE STUDIES
, PRESSURE, PHYSICAL PROPERTIES.) (TEST EQUIPMENT, DESIGN, HAZARDS.)
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269 206   0493   THE ARC JET AS A MEANS OF PRODUCING FULL TEMPERATURE
SIMULATION IN A HYPERSONIC WIND TUNNEL 9APPLICATION OF A CROSSED FIELD
ACCELERATORO.

269 206   0493   THE GENERAL CONCEPT OF USING CROSSED ELECTROSTATIC
AND MAGNETIC FIELDS TO ACCELERATE THE FLOW OF AN IONIZED PLASMA WAS
INVESTIGATED EXPERIMENTALLY AND THEORETICALLY. THE EXPERIMENTAL
INSTALLATION CONSISTS OF THE FOLLOWING UNITS AN AIR-STABILIZED ARC
WHICH SERVES AS THE PLASMA GENERATOR, AN INLET VIEWING CHAMBER FOR
VELOCITY MEASUREMENTS, THE ACCELERATION SECTION, AN OUTLET VIEWING
CHAMBER, THE TEST SECTION WITH QUARTZ VIEWING WINDOW, AND FINALLY THE
VACUUM SYSTEM. THE EXPERIMENTAL EFFORT CONSISTS IN CORRELATING THE
INPUT AND OUTPUT ACCELERATOR VELOCITY AND MACH NUMBER WITH THE APPLIED
ELECTROMAGNETIC FIELDS, MASS FLOW, AND GROSS OPERATING PARAMETERS OF
THE INSTALLATION. THE THEORETICAL RESULTS OF THE ONE-DIMENSIONAL,
STEADY, COMPRESSIBLE FLOW TREATMENT OF THE PROBLEM ARE PRESENTED.
THESE RESULTS ARE SUMMARIZED IN THE FORM OF NONDIMENSIONAL CHARTS WHICH
DISPLAY THE ROLE OF THE RELEVANT NONDIMENSIONAL GROUPS THAT ENTER INTO
THE INTERACTION. THESE CHARTS READILY ESTABLISH THE PERFORMANCE LIMITS
OF SUCH AN ACCELERATOR.

269 206   0491   *HYPERSONIC WIND TUNNELS, ELEC-TRIC ARCS, PLASMA JETS,
ACCELERATION BY ION ACCELERATORS, SUPERSONIC NOZZLES, MAGNETO-HYDRODYNAM
ICS, DESIGN, MATHEMATICAL ANALYSIS, TABLES.) (HYPERSONICS, TEMPERATURE,
 HIGH TEMPERATURE RESEARCH, SIMULATION, WIND TUNNELS, TEST FACILITIES.)
-

269 208   0494   FLIGHT VIBRATION SURVEY OF JRB-52B AIRCRAFT.

269 208   0494   THE JRB-52B AIRCRAFT WAS SURVEYED TO DETERMINE THE
VIBRAT 'N ENVIRONMENT EXISTING THROUGHOUT THE VEHICLE UNDER ALL FLIGHT
CONDITIONS EXPECTED IN SERVICE. APPROXIMATELY 34,000 DATA POINTS WERE
OBTAINED FROM 26 SEPARATE LOCATIONS ON THE VEHICLE DURING 7 TEST
FLIGHTS. THE DATA OBTAINED WERE EVALUATED TO DETERMINE THE ADEQUACY OF
VIBRATION TEST REQUIREMENTS FOR LONG RANGE BOMBER EQUIPMENT CONTAINED
IN MIL-E-5272A.   THE DATA INDICATED THAT THE VIBRATION TEST
REQUIREMENTS OF THAT SPECIFICATION WERE SATISFACTORY TO SIMULATE THE
ACTUAL ENVIRONMENT EXISTING ON THE JRB-52B AIRCRAFT.

269 208   0492   (*JET BOMBERS, JET PLANES, VIBRATION, DYNAMICS, FLIGHT
TESTING, TEST METHODS, TEST EQUIPMENT.)   -
269 209   0495   A REVIEW OF RECENT DEVELOPMENTS IN TITANIUM AND
TITANIUM ALLOY TECHNOLOGY.

269 209   0495   A STUDY OF THE AIR CONTAMINATION AND PROTECTION FOR
4 DOD TI SHEET ALLOYS INDICATED THAT TI-4AL3MO-1V AND TI-6AL-4V HAD
ABOUT EQUAL RESISTANCE TO PENETRATION BY INTERSTITIAL CONTAMINANTS.
THE HARDNESS PENETRATION TESTS SHOWED TI-13V11CR-3AL AND TI-2.5AL-16V
ALLOYS HAD LOWER RESISTANCE TO CONTAMINATION IN THAT ORDER. THE
TI-5AL-2.5SN, TI-6AL-4V, AND TI-13V-11CR-3AL ALLOYS WERE EVALUATED FOR
SUSCEPTIBILITY TO H EMBRITTLEMENT INDUCED BY CHEMICALLY MILLING IN A
HYDROFLUORIC ACID BATH. THE ALL-ALPHA TI-5AL2.5SN ALLOY WAS NOT

EMBRITTLED. THE TI-6AL-4V ALLOY WAS ONLY SLIGHTLY EMBRITTLED, WHILE
THE TI-13V-11CR-3AL ALLOY WAS SEVERELY EMBRITTLED. AN
INVESTIGATION CONCERNING THE TITANIUM-LOX REACTION WAS CONDUCTED BY
USING HIGH-PRESSURE GASEOUS O. THE STUDY ESTABLISHED THAT A FRESH TI
SURFACE WOULD REACT WITH GASEOUS O UNDER ABOUT 100-PSIG PRESSURE
BETWEEN -250 F AND ROOM TEMPERATURE. SEVERAL METHODS OF PRODUCING FLAT
SOLUTION-TREATED TITANIUM ALLOY SHEET ARE REVIEWED AND A NEW CONCEPT
IS DESCRIBED. BASICALLY, THE NEW METHOD INVOLVES HEATING AND COOLING
THE SHEET UNDER TENSION.

269 209   0493   (*TITANIUM ALLOYS, *SHEETS, CONTAMINATION, AIR, GASES,
CORROSION INHIBI-TION, HIGH TEMPERATURE RESEARCH.) (CHEMICAL MILLING, O
XIDATION, OXIDATION INHIBITORS, COATINGS.) IGNITION, MANUFACTURING METH
ODS, MECHANICAL PROPERTIES, IMPURITIES, PROCESSING, EXTRUSION, METALLURG
Y.   -
269 188   0532   DEVELOPMENT OF PROCEDURES FOR WELDING 2-INCHTHICK
TITANIUM-ALLOY PLATE.
          NO ABSTRACT AVAILABLE

269 188   0494   (*TITANIUM ALLOYS, *METAL PLATES, *ARC WELDS, *WELDS,
*WELDED JOINTS, WIRE, *WELDING, ARC WELDING, MECHANICAL PROPERTIES, TE
NSILE PROPERTIES, FRACTURE (MECHANICS), IMPACT SHOCK.) (ALUMINUM ALLOY
S, TIN ALLOYS, VANADIUM ALLOYS, NIOBIUM ALLOYS, SUBMARINE HULLS.)   -
269 189   0533   GAS TURBINE AND JET ENGINE FUELS.
          NO ABSTRACT AVAILABLE

269 189   0495   (*TURBOJET ENGINES, DUCT INLETS, GUIDE VANES, RELIABIL
ITY, CORROSION BY SUL-FUR AND SEA WATER, TESTS.) (COMBUSTION CHAMBERS,
COMBUSTION CHAMBER LINERS, SHIELDING, THERMAL RADIATION, CORROSION, ERO
SION FROM FLAMES, COMBUSTION CHAMBER GASES, TESTS.) (HYDROCARBONS, JET E
NGINE FUELS.)   -
269 190   0534   DEFENSE METALS INFORMATION CENTER SELECTED
ACCESSIONS. DECEMBER 1961.

          NO ABSTRACT AVAILABLE

269 190   0496   (*BIBLIOGRAPHY, *MATERIALS, *METALS, ALLOYS, CERAMIC MA
TERIALS, REFRACTORY MATERIALS, RARE EARTH E LEMENTS, PROCESSING, MECHANI
CAL PROPERTIES, PHYSICAL PROPERTIES.)   -
269 191   0535   THE PHYSIOLOGY OF MECHANICAL TRAUMA.

          NO ABSTRACT AVAILABLE

269 191   0497   (*SURGICAL TRAUMA, *KIDNEYS, PATHOLOGY, TRAUMATIC SHOCK
.) (HEART ARREST, *PLASMA VOLUME, RESPIRATION.) (*WOUNDS, BACTERIA, CL
OSTRIDIUM HISTOLYTICUM.) (*ORTHOPEDICS, STAINLESS STEEL, SURGERY, ARTHRO
PLASTY.)   -
269 192   0536   THE MAGNUS FORCE ON A ROTATING CYLINDER IN TRANSONIC
CROSS FLOWS.

          NO ABSTRACT AVAILABLE
269 192   0498   (CYLINDRICAL BODIES, BODIES OF R EVOLUTION, *TRANSONIC
FLOW, *SUPERSONIC FLOW, *BALLISTICS, *AERODYNAMICS, LIFT, DRAG.) (ANGLE
OF ATTACK INDICATORS, LAMINAR BOUNDARY LAYER, TURBULENT BOUNDARY LAYER,
WAKE, VELOC-ITY, DENSITY, SPARK SHADOWGRAPH PHOTOGRAPHY.) (WIND TUNNELS,
WIND TUNNEL MODELS, TESTS.)   -

269 196   0537   MATERIALS PROPERTY DATA.
          NO ABSTRACT AVAILABLE

269 196   0499   (FRICTION BRAKES, *BRAKE LININGS, MATERIALS, METALS, AL
LOYS, ADDITIVES, GRAPHITE, AIRCRAFT.) (TESTS, TEST EQUIPMENT, TEST FACI
L-ITIES, HIGH TEMPERATURE RESEARCH.) (EROSION, DEPOSITS.) (*ROCKET MOT
ORS, *ROCKET MOTOR NOZZLES, MATERIALS, *REFRACTORY MATERIALS, IN-SULATIN
G MATERIALS, THERMAL INSULATION, *RE-FRACTORY COATINGS, CERMETS, CERAMIC
MATERIALS, SILICON COMPOUNDS, BERYLLIUM COMPOUNDS, ZIR-CONIUM COMPOUNDS
, MAGNESIUM COMPOUNDS, OXIDES, TUNGSTEN, STEEL, TUNGSTEN ALLOYS, MOLYBDE
NUM ALLOYS, *GRAPHITE, HEAT RESISTANT POLYMERS.)   -
269 197   0538   PROBLEMS OF THE MECHANICS OF INTERPLANETARY SPACE
TRAVEL,
          NO ABSTRACT AVAILABLE

269 197   0500   (*SPACESHIPS, *SPACE FLIGHT, SPACE PROBES, SPACE NAVIG
ATION, *CELESTIAL MECHANICS, LAUNCHING, FLIGHT PATHS, VELOCITY, THRUST,
GRAVITY, MATHEMATICAL ANALYSIS, THEORY.)   -
269 199   0539   EFFECT OF STRESS ON THE CREEP RATE OF HIGH PURITY
ALUMINUM IN THE CROSS-SLIP REGION.

          NO ABSTRACT AVAILABLE
269 199   0501   (*ALUMINUM, CRYSTALS, CRYSTAL STRUCTURE, LATTICES, TEM
PERATURE, STRESSES, DEFORMATION, *CREEP, THEORY, ENERGY.)   -
269 204   0540   OPERATIONAL GROUND SUPPORT EQUIPMENT SYSTEM
SPECIFICATION FOR 566TH SMS-OFFUTT AIR FORCE BASE.

          NO ABSTRACT AVAILABLE

269 204   0502   (*GROUND SUPPORT EQUIPMENT, SPECIFICATIONS FOR SURFACE
TO SURFACE, *GUIDED MISSILES.) (LAUNCHING, PREPARATION, MAINTE-NANCE.)
(BOOSTER ROCKETS, HANDLING, TRANSPOR-TATION.) HYDRAULIC SYSTEMS, FUEL
CONSUMPTION, RELIABILITY.   -
269 006   0541   EXTENSIONS OF A THEOREM BY CLARK,

          NO ABSTRACT AVAILABLE

269 006   0503   (*LINEAR PROGRAMMING, *MATRIX ALGEBRA, SCHEDULING, THEO
RY.)   -
269 017   0542   PENDULUM TESTS OF TWO CRUISE FOILS AND VARIOUS
STRUTS,
          NO ABSTRACT AVAILABLE

269 017   0504   (*HYDROFOILS, DESIGN, PARA-BOLIC BODIES, LIFT, DRAG, CA
VITATION, SPLIT FLAPS, FLAPS, WATER TUNNELS, TESTS, MODEL TESTS, TEST EQ
UIPMENT, TEST METHODS, *HYDRO-DYNAMICS, STRUCTURES.)   -
269 031   0543   ELECTROMAGNETIC VACUUM BALANCE,

          NO ABSTRACT AVAILABLE

269 031   0505   (*BALANCES, *ELECTROMAGNETS, VACUUM SYSTEMS, USSR, DESI
GN.) (*ELECTRICAL NETWORKS, CIRCUITS, VARIABLE RESISTORS, GALVANOMETERS
, SOLENOIDS.)   -

269 041   0544   INSTRUMENTATION FOR THE DETERMINATION OF THE
COMPOSITION OF THE UPPER ATMOSPHERE.

NO ABSTRACT AVAILABLE

269 041   0506   (GEOPHYSICS, INSTRUMENTATION, DESIGN, TESTS.)   (*MASS S
PECTROMETERS FOR SOUNDING ROCKETS, MASS SPECTROSCOPY OF *UPPER ATMOSPHER
E, ATMOSPHERE, HELIUM, OXYGEN, NITRO-GEN, SPECTROGRAPHIC ANALYSIS.)   (IO
NIZATION GAGES, PRESSURE GAGES, MANOMETERS, CALIBRA-TION, TESTS.)   (ATMO
SPHERE MODELS, ANALYSIS.)   —
269 042   0545   AFT-END CLOSURE STUDY FOR POLARIS A-3 ROCKET MOTOR
CASE.
                   NO ABSTRACT AVAILABLE

269 042   0507   (*GUIDED MISSILES, UNDERWATER TO SURFACE, ROCKET MOTORS
, *ROCKET CASES, COMBUSTION CHAMBERS, GLASS TEXTILES, METAL GLASS ADHESI
VES, RUBBER SEALS, BONDING, ALU-MINUM ALLOYS, SHEAR STRESSES, STRESSES,
HY-DROSTATIC PRESSURE, TESTS.)   (ROCKET CASES, FILAMENT WOUND CONSTRUCTI
ON, TEST METHODS.)   —
269 051   0546   THE ELECTROSTATIC INSTABILITY OF A BEAM OF CHARGED
PARTICLES PENETRATING A PLASMA,

NO ABSTRACT AVAILABLE

269 051   0508   (*PARTICLE BEAMS, ELECTRON BEAMS, PARTICLES, STABILITY,
 ELECTROMAGNETIC WAVES, ELECTROSTATICS, TRANSPORT PROPERTIES, *PLASMA PH
YSICS, PLASMA OSCILLATIONS, PENETRA-TION, MAGNETIC FIELDS, DIELECTRICS.)
   (PER-TURBATION THEORY, INTEGRAL EQUATIONS, MATRIX ALGEBRA.)   —
269 055   0547   PROBLEMS OF SPACECRAFT SCIENTIFIC INSTRUMENT
CALIBRATION AND SYSTEMS TESTS,

NO ABSTRACT AVAILABLE

269 055   0509   (GUIDED MISSILE RESEARCH, *SPACE-SHIPS, LUNAR PROBES, S
PACE PROBES, ELECTRONIC EQUIPMENT, *FL-IGHT INSTRUMENTS, DETECTORS, GROUN
D SUPPORT EQUIPMENT, INSTRUMENTATION, CALIBRATION, TEST SETS, TEST EQUIP
MENT.)   —
269 083   0548   SPECIAL PURPOSE ANALYSIS TECHNIQUES.

NO ABSTRACT AVAILABLE

269 083   0510   (*DIRECTION FINDING, AUTOMATIC, *RADIO INTERCEPTION, RA
DIO SIGNALS, HIGH FREQUENCY, RADIO RECEIVERS, BEARING FINDING, DISPLAY S
YSTEMS, *DIGITAL COMPUTERS, PULSE ANALYZERS, CALIBRATION, *LOOP ANTENNAS
, ANTENNAS, DESIGN, TESTS.)   (*RADIO SIGNALS, DETECTORS, IDENTIFICATION
, DATA STORAGE SYSTEMS, ANALYSIS.)   —
269 088   0549   ACOUSTIC SPIN-WAVE BRANCHES OF A CLASS OF
FERRIMAGNETS.

NO ABSTRACT AVAILABLE

269 088   0511   (CRYSTALS, DEFORMATION, FERRITES, *FERROMAGNETIC MATERI
ALS, MAGNETITE, GARNET, *CRYSTAL STRUCTURE, MAGNETIC EFFECTS, MAGNETIC P
ROPERTIES.)   (*ACOUSTICS, ENERGY, WAVE TRANS-MISSION, SPIN.)   (DATA, TAB
LES.)   —

269 096   0550   NUCLEAR MAGNETIC RESONANCE IN ALUMINUM AND COPPER
SINGLE CRYSTALS,

    NO ABSTRACT AVAILABLE

269 096   0512   (METALLIC CRYSTALS, METALS, *ALUMINUM, *COPPER, SINGLE
CRYSTALS, *NUCLEAR MAGNETIC RESONANCE, ABSORPTION, MAGNETIC MOMENTS, ME
ASUREMENT, SPECTROPHOTOMETERS, TEST METHODS, CRYSTAL STRUCTURE.)   -
269 101   0551   POLYSTATION DOPPLER TRACKING.

    NO ABSTRACT AVAILABLE

269 101   0513   (*DOPPLER TRACKING, DOPPLER SYSTEMS, TRACKING, *SATELL
ITE VEHICLES, RADIO TRANSMITTERS, AIRBORNE, ORBITAL FLIGHT PATHS, DETERM
INATION, FEASIBILITY STUDIES.) (RADIO STATIONS, RADIO RECEIVERS, DATA PR
OCESSING SYSTEMS, POSITION FINDING, ERRORS, EFFECTIVENESS.)   -
269 104   0552   SATELLITE CHARGE-UP AS A MEANS OF MAINTAINING THE
SHAPE OF ECHO-TYPE SATELLITES IN THE OUTER VAN ALLEN BELT,

    NO ABSTRACT AVAILABLE

269 104   0514   (*SATELLITE VEHICLES, BALLOONS, SATELLITES, RADIO, REF
LECTORS, RADIO COMMUNICA-TION SYSTEMS, HAZARDS FROM METEORITES, REDUC-TI
ON BY VAN ALLEN RADIATION BELTS, ELECTRICAL EFFECTS.)   -
269 105   0553   VALUES OF LARGE GAMES, III A CORPORATION WITH TWO
LARGE STOCKHOLDERS,

    NO ABSTRACT AVAILABLE

269 105   0515   (*GAMES THEORY, MANAGEMENT ENGINEERING, COMMERCE, CONTR
OL, ECONOMICS, INDUSTRY.)   -
269 108   0554   MATERIALS FOR AND THE MECHANISM OF GETTERING MULTIPLE
COMPONENT GASES.

    NO ABSTRACT AVAILABLE

269 108   0516   (*ELECTRON TUBES, METALS, SUR-FACES, *DEGASIFICATION, *
GAS DIFFUSION, *GASES, CHEMICAL REACTIONS, REACTION KINETICS, GAS IONIZA
TION, PRESSURE, THEORY.) (MASS SPEC-TROSCOPY, MASS SPECTROMETERS, VACUU
M APPARATUS, DESIGN.) MATERIALS.   -
269 109   0555   A TECHNIQUE FOR THE LONGITUDINAL STUDY OF GROUP
STABILITY AND ITS APPLICATION TO GROUP HOMEOSTASIS,

    NO ABSTRACT AVAILABLE

269 109   0517   (*GROUP DYNAMICS, *SOCIAL COM-MUNICATION, *LABOR, MEASU
REMENT.) STATISTICAL ANALYSIS, SOCIOMETRICS, PROBABILITY, MATRIX ALGEBRA
.   -
269 114   0556   THE ORBITS OF THE SATELLITES 1959 ALPHA-1 AND 1959
ALPHA-2 AND THE PERTURBATIONS ON THE PERIGEE DISTANCE OF 1959
ALPHA-1.

    NO ABSTRACT AVAILABLE

269 114   0518   (*SATELLITE VEHICLES, *ORBITAL FLIGHT PATHS, TRACKING T
ELESCOPES, ASTRONOMICAL DATA, TABLES.) (DRAG, CELESTIAL MECHANICS, PERT
URBATION THEORY, MATHEMATICAL ANALYSIS.)   -

269 115   0557   CATALOG OF PRECISELY REDUCED OBSERVATIONS NO. P-1.

         NO ABSTRACT AVAILABLE

269 115   0519   (*SATELLITE VEHICLES, *ORBITAL FLIGHT PATHS, TRACKING T
ELESCOPES, ASTRONOMICAL DATA, TABLES.)   –

269 117   0558   EXISTENCE OF SMOOTH SOLUTIONS OF THE CAUCHY PROBLEM
FOR DIFFERENTIAL SYSTEMS OF ANY TYPE,

         NO ABSTRACT AVAILABLE

269 117   0520   (*PARTIAL DIFFERENTIAL EQUATIONS, *COMPLEX VARIABLES, F
OURIER ANALYSIS, GREEN S FUNCTION, MATRIX ALGEBRA, POLYNOMIALS, INTEGRAL
 TRANSFORMS TAYLOR S SERIES.)   –

269 134   0559   RESEARCH ON ELECTRON BOMBARDMENT INDUCED CONDUCTIVITY
TARGETS IN CAMERA TUBES.

         NO ABSTRACT AVAILABLE

269 134   0521   (*CAMERA TUBES, *ICONOSCOPES, ELECTRON BOMBARDMENT, CON
DUCTIVITY, SECONDARY EMISSION, SIGNAL-TO-NOISE RATIO, ELECTRON MULTIPLIE
RS, ARSENIC COMPOUNDS, SULFIDES, HALIDES, SELENIDES, ALKALI METAL COMPOU
NDS, THIN FILMS, TARGETS FOR IMAGE TUBES, IMAGE INTENSIFIERS (ELECTRONIC
S), THEORY, DESIGN, TESTS.) MATHEMATICAL ANALYSIS.   –

269 826   0560   INVESTIGATION OF STRESS-CORROSION CRACKING OF
HIGH-STRENGTH ALLOYS.

         NO ABSTRACT AVAILABLE

269 826   0522   (*ALLOYS, *STEEL, *STAINLESS STEEL, *TITANIUM ALLOYS, S
TRESSES, CORROSION, FRACTURE (MECHANICS).) (ROCKET CASES, MATE-RIALS.)
 (CORROSIVE LIQUIDS, CORROSIVE GASES, SOLUTIONS, SOLID ROCKET PROPELLANT
S.)   –

269 878   0561   SCIENTIFIC EXPERIMENTS FOR RANGER 3, 4, AND 5.

         NO ABSTRACT AVAILABLE

269 878   0523   (*LUNAR PROBES, INSTRUMENTATION FOR MOON, LANDING.) (G
UIDED MISSILE TRAJEC-TORIES, SATELLITE VEHICLE TRAJECTORIES, GUID-ANCE.)
 (TELESCOPES, *TELEVISION CAMERAS, TELEMETERING TRANSMITTERS, DIGITAL C
OMPUTERS FOR TELEVISION DISPLAY SYSTEMS, PHOTOGRAPHS.) (*GAMMA RAY SPECT
ROMETERS, DESIGN FOR SURFACES, ANALYSIS.) (*RADIO ALTIMETERS FOR RADAR
REFLECTIONS, MEASUREMENT.) (*SEISMOGRAPHS, RECORDING DEVICES, DATA STOR
AGE SYSTEMS, DATA TRANSMITTING SYSTEMS.)   –

269 817   0562   ON THE FUNDAMENTAL EQUATIONS OF THE KINETIC THEORY
OF GASES,

         NO ABSTRACT AVAILABLE

269 817   0524   (*GASES, *KINETIC THEORY, GAS IONIZATION, *QUANTUM STAT
ISTICS, TRANSPORT PROPERTIES, SUPERAERODYNAMICS.) (SPHERES, PARTICLES,
 PENETRATION.) (INTEGRAL EQUATIONS, INTEGRALS, STATISTICAL ANALYSIS, PH
YSICS, PROB-ABILITY, STATISTICAL DISTRIBUTIONS, STATISTICAL FUNCTIONS, F
UNCTIONS.)   –

269 821   0563   A REVIEW ABOUT THE THEORY OF THE CONDENSATION OF
DROPS,

         NO ABSTRACT AVAILABLE

269 821   0525   (*WATER VAPOR, *CONDENSATION, THEORY, GASES, AEROSOLS, KINETIC THEORY.) (PHYSICAL PROPERTIES, SURFACE PROPERTIES, THERMODYNAMICS, CHEMICAL PROPERTIES.) (MATHE-MATICAL ANALYSIS, PARTIAL DIFFERENTIAL EQUA-TIONS.)   —

269 848   0564   MILIMETER WAVE RESEARCH,

NO ABSTRACT AVAILABLE

269 848   0526   (*MICROWAVES, ANALYSIS, WAVE TRANSMISSION, WAVEGUIDES, ELECTROMAGNETIC WAVES, SPECTROGRAPHIC ANALYSIS, REFLECTION, MEASUREMENT.) (OPTICS, POLARIZATION.) (IN-STRUMENTATION, SHEETS, RADIO FREQUENCY FILTERS, ELECTRIC FILTERS, ANTENNAS, HARMONIC ANALYSIS, DETECTORS, POWER SUPPLIES.)   —

269 860   0565   THE CONSTANT-RATIO RULE AND VISUAL DISPLAYS,

NO ABSTRACT AVAILABLE

269 860   0527   (*VISUAL PERCEPTION, *DISPLAY SYSTEMS, REACTION (PSYCHOLOGY), INTELLIGI-BILITY, POSITION FINDING, *STATISTICAL ANALY-SIS.) (*VISIBILITY, *VISUAL THRESHOLDS, *SPACE PERCEPTION, BRIGHTNESS.) INFORMATION THEORY.   —

269 862   0566   ON EFFECTS OF CARBON AND MANGANESE CONTENT AND OF GRAIN SIZE ON DYNAMIC STRENGTH PROPERTIES OF MILD STEEL.

NO ABSTRACT AVAILABLE

269 862   0528   (*STEEL, MECHANICAL PROPERTIES, PLASTIC FLOW, FRACTURE (MECHANICS), STRESSES, IMPACT SHOCK.) (ADDITIVES, CARBON, MANGANESE.) GRAINS (METALLURGY).   —

269 965   0567   RESEARCH ON THERMAL CONVECTION IN ROTATING FLUIDS.

NO ABSTRACT AVAILABLE

269 965   0529   (CYLINDRICAL BODIES, *FLUIDS, *FLUIDS FLOW, ROTATION, THERMODYNAMICS, HEAT TRANSFER, HYDRODYNAMICS.) (WATER, GLYCOLS, DENSITY, ACCELERATION, GRAVITY, TEMPERATURE, OSCILLATION, VISCOSITY.)   —

270 039   0568   PRESENTATION OF CREEP DATA FOR DESIGN PURPOSES.

NO ABSTRACT AVAILABLE

270 039   0530   (*TITANIUM ALLOYS, ALUMINUM AL-LOYS, TIN ALLOYS, *IRON ALLOYS, *NICKEL ALLOYS, CHROMIUM ALLOYS, COBALT ALLOYS, *STEEL, *HEAT RESISTANT ALLOYS, HIGH TEMPERATURE RESEARCH, HIGH PRESSURE RESEARCH, *CREEP, MECHANICAL PROPERTIES, DEFORMATION, STRESSES, TEMPERATURE, MATHEMATICAL ANALYSIS, TESTS.) AIRCRAFT, STRUCTURES, DESIGN, MATERIALS.   —

270 174   0569   VARIATIONAL CALCULATIONS OF SCATTERING,

NO ABSTRACT AVAILABLE

270 174   0531   (*SCATTERING, MATHEMATICAL ANALYSIS, *CALCULUS OF VARIATIONS, MATRIX ALGEBRA.)   —

269 900   0570   CONVERSION OF AN/ARR-41 RADIO RECEIVER TO SINGLE SIDEBAND OPERATION.

NO ABSTRACT AVAILABLE

269 900   0532   *RADIO RECEIVERS, AIRBORNE, SIDE-BANDS, AMPLITUDE MODULATION, RADIO COMMUNICA-TION SYSTEMS, HIGH FREQUENCY.   —

270 026   0571   GLOSSARY OF TERMS. DATA REDUCTION AND COMPUTING
WORKING GROUP.

          NO ABSTRACT AVAILABLE

270 026   0533   (GUIDED MISSILES, *ROCKETS, *TRACKING, COMPUTERS, *DICT
IONARIES.) RANGE.   -

270 027   0572   GLOSSARY OF TERMS, ELECTROMAGNETIC PROPAGATION
WORKING GROUP.

          NO ABSTRACT AVAILABLE

270 027   0534   (*ELECTROMAGNETIC WAVES, RADIO WAVES, *PROPAGATION, *DI
CTIONARIES.)   -

270 176   0573   THE IMPORTANCE OF ANGULAR CORRELATIONS BETWEEN ATOMIC
ELECTRONS,

          NO ABSTRACT AVAILABLE

270 176   0535   (ATOMS, *ATOMIC ENERGY, *ELEC-TRONS, *ELASTIC SCATTERIN
G, ELECTRON TRANSI-TIONS, HYDROGEN.)   (QUANTUM MECHANICS, WAVE ANALYSIS,
NUMERICAL ANALYSIS.)   -

270 001   0574   FUEL CELL AND ITS RELATED TECHNOLOGY.   II.
CORRELATION BETWEEN INFRARED SPECTRUM AND CATALYTIC ACTIVITY OF
ELECTRODE.

          NO ABSTRACT AVAILABLE

270 001   0536   (*FUEL CELLS, CHEMICAL REACTIONS, *ADSORPTION, *CATALYS
IS, *ELECTRODES, *INFRARED SPECTROSCOPY, THEORY.)   (NICKEL PLATING, COAT
-INGS, THIN FILMS ON CALCIUM COMPOUNDS, FLUO-RIDES BY VACUUM SYSTEMS, TR
ANSMISSIONS, THICKNESS.)   -

270 234   0575   CONTROL SYSTEMS FOR HIGHWAY TRAINS.

          NO ABSTRACT AVAILABLE

270 234   0537   (CONTROL SYSTEMS FOR .*CARGO VEHICLES, FEASIBILITY STUDI
ES, TESTS.)   (ARMY OPERATIONS, *VEHICLES, ANALOG COMPUTERS, MATHEMATICAL
ANALYSIS.)   (TERRAIN, *MILITARY TRANSPORTATION, TRAFFIC.)   -

270 250   0576   STUDY OF LOW-SPEED AERODYNAMIC CHARACTERISTICS OF A
RIGHT-TRIANGULAR PYRAMID CONFIGURATION,

          NO ABSTRACT AVAILABLE

270 250   0538   (GLIDERS, *TRIANGULAR WINGS, WEDGES, WIND TUNNEL MODELS
, STABILITY, STABIL-ITY (LATERAL), STABILITY (LONGITUDINAL), LIFT, DRAG,
AERODYNAMICS, TESTS.)   -

270 238   0577   VECTORCARDIOGRAPHIC DIAGNOSIS WITH THE AID OF ALGOL,

NO ABSTRACT AVAILABLE

270 238   0539   (*HEART, *MUSCLES, *ELECTRO-CARDIOGRAPHY, ELECTRICAL PR
OPERTIES, DIAGNOSIS, COMPUTERS, STATISTICAL ANALYSIS.)   -
270 064   0578   SPACE NAVIGATION SYSTEMS AND DEVICES   AN ANNOTATED
BIBLIOGRAPHY,

NO ABSTRACT AVAILABLE

270 064   0540   (*BIBLIOGRAPHY, *SPACE NAVIGATION.) (*AERONAUTICS, *SP
ACE FLIGHT, SATELLITES, RE-ENTRY VEHICLES, MANNED.) (*SPACE PROBES, *LU
NAR PROBES, LANDING.) (ELECTRONIC EQUIPMENT, *GUIDANCE, CONTROL SYSTEMS.
)   -
270 051   0579   OXIDATION OF METALS AND ALLOYS.

NO ABSTRACT AVAILABLE

270 051   0541   (HIGH TEMPERATURE RESEARCH, TRANSPORT PROPERTIES, *OXI
DATION, *METALS, *ALLOYS, SINGLE CRYSTALS, IRON, MAGNETIC FIELDS, TRACE
R STUDIES, *DIFFUSION, IONS, IRON COMPOUNDS, SULFIDES, LATTICES, ELECTRO
NS, SPIN.)   -
270 155   0580   INVESTIGATION AND FUNDAMENTAL STUDY OF CRYOSAR
OPERATION AND APPLICATION.

NO ABSTRACT AVAILABLE

270 155   0542   (*DIGITAL SYSTEMS, *DATA STORAGE SYSTEMS, ELECTRONIC CI
RCUITS, OPERATION.) (*GERMANIUM, ELECTRONS, INELASTIC SCATTERING, IMPURI
TIES.) (*CRYSTALS, PRODUCTION, GROWTH, IMPURITIES, ELECTRICAL PROPERTIE
S, LOW TEMPERA-TURE RESEARCH.)   -
269 912   0581   DEEP DRAWN PRE-PRODUCTION UNITS A2 1ST STAGE   POLARIS
ROCKET MOTOR CHAMBERS AND A2 1ST STAGE POLARIS AFT CLOSURES.

NO ABSTRACT AVAILABLE

269 912   0543   (SOLID ROCKET PROPELLANTS, *ROCK-ET MOTORS, *ROCKET CAS
ES, *ROCKET MOTOR NOZZLES, PROCESSING, MANUFACTURING METHODS, PRODUCTION
TEST METHODS, METALLURGICAL ANALYSIS, HARDNESS, LOW TEMPERATURE RESEARCH
, PHASE TRANSITIONS, STRESSES, WELDING, WELDS, MICRO-STRUCTURE.) (STEEL
, MANGANESE ALLOYS, CHROM-IUM ALLOYS, MOLYBDENUM ALLOYS, IMPACT SHOCK.)
    -

Hq. ESD, L.G. Hanscom Field, Bedford, Mass.
Rpt. No. ESD-TDR-63-159 Suppl. 1.
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